12/53

Better Homes and Gardens®

WOOD®

THE WORLD'S LEADING WOODWORKING MAGAZINE

AUGUST 1992 • ISSUE NO. 53
Please display until August 10

Try your hand at TIN-PUNCHING
Page 42

WOOD EVALUATES 59 FINISH REMOVERS

CRAFT-SHOW TOYMAKER SHARES HIS SECRETS FOR SUCCESS

SCHOOL'S OPEN FOR WOODWORKERS

PROJECTS THAT PLEASE

- Carved daffodil
- Turned music box
- Caterpillar puzzle toy
- Teddy bear wall plaque
- Kachina pendant
- Kid's wooden wagon

PUNCHED-TIN PIE SAFE

See page 47

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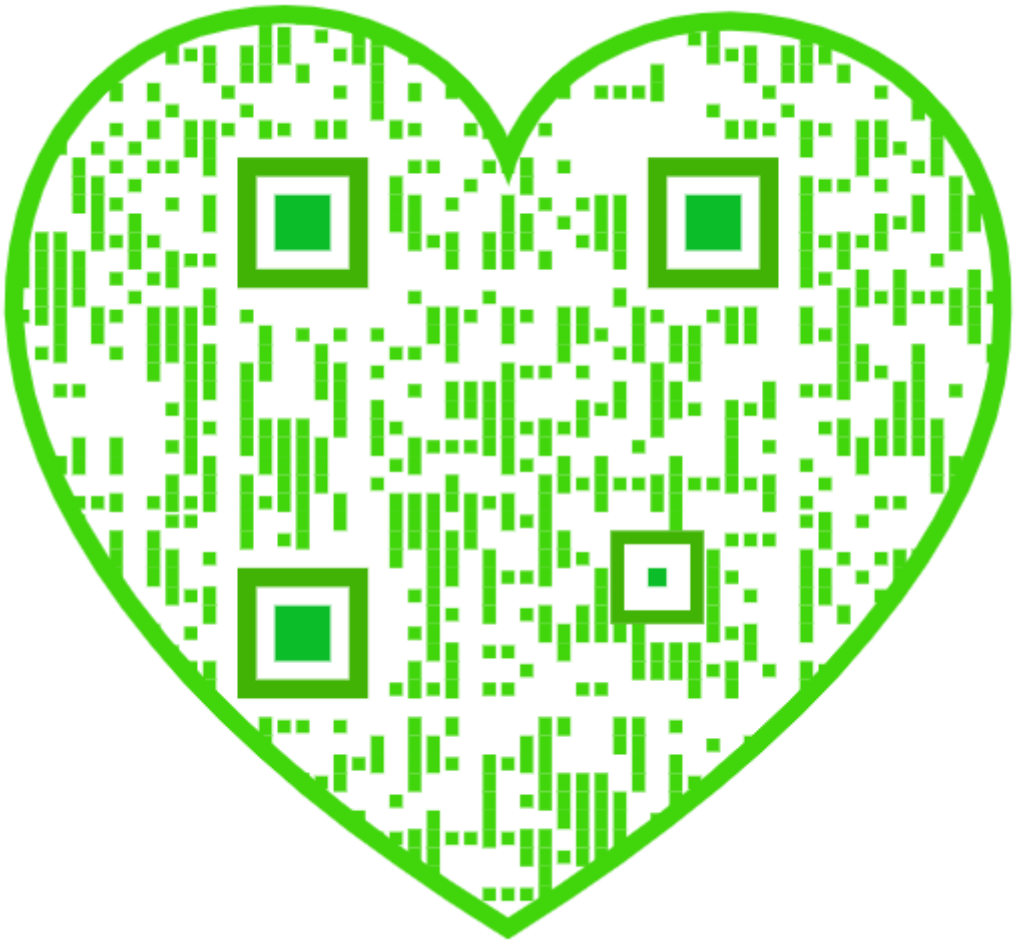
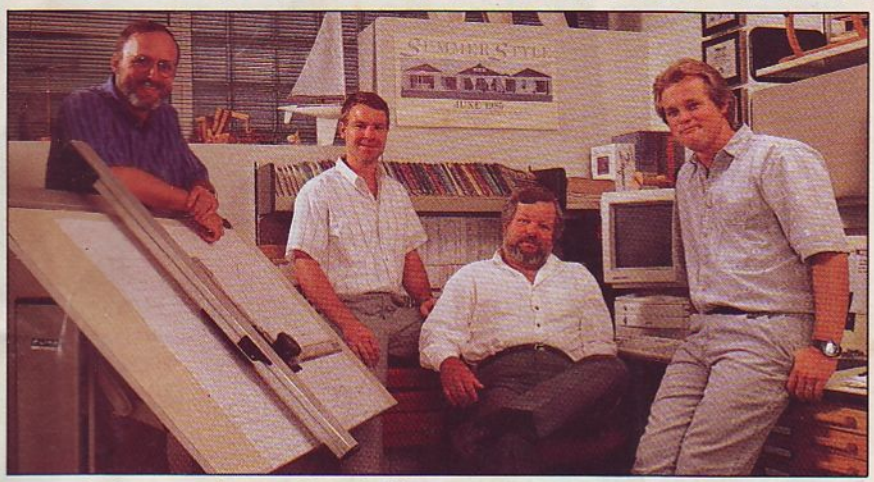


THE EDITOR'S ANGLE

HOW ABOUT A ROUND OF APPLAUSE FOR THE *WOOD*® MAGAZINE

TECHNICAL-ILLUSTRATION TEAM



Four of the very best technical illustrators in the woodworking-publication business (Bill Zaun, Mike Henry, Jim Downing, and Kim Downing) talking things over in Jim's office.

No doubt you've heard the old saying, "A picture is worth a thousand words." Well, in the woodworking-publication business, it's literally true. If you're like me, you know that words alone don't always explain things sufficiently. More often than not, I need to actually see it to really understand how to do something.

That's why at *WOOD* magazine we feel that it's important to include exploded-view drawings to show how projects go together, section-view drawings to illustrate an important joinery detail, or whatever else you need to ensure your success when building one of our projects. We think we owe you that.

As you might expect, it takes people with special skills to execute the technical illustrations you see in each issue of this magazine. And we're lucky indeed to have some of the very best talent in the country to help us with this important part of our product.

You probably recognize Jim Downing, our Design Editor and resident technical illustrator. Jim's the person who assigns a particular project to one of the three freelance technical illustrators shown in the photograph with him. On the left we have Bill Zaun, next to him, Mike Henry, and to Jim's left, Kim Downing. This talented group of guys work and rework the drawings that accompany our projects until they've eliminated the bugs for you.

Over time, we've heard from lots of readers who appreciate the skill with which our technical-illustration team handle their work. So I thought it was high time you got an opportunity to meet them.

Larry Clayton

Photograph: Wm. Hopkins

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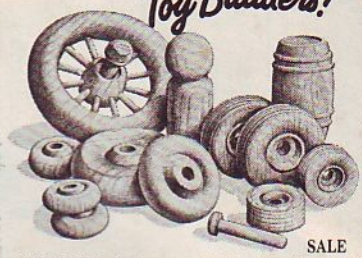

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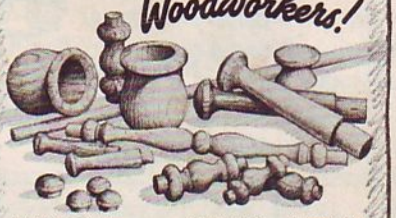
Woodworkers!



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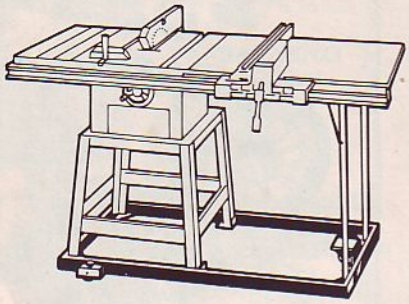

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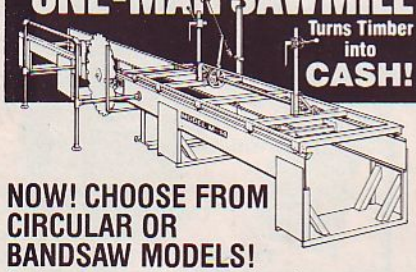

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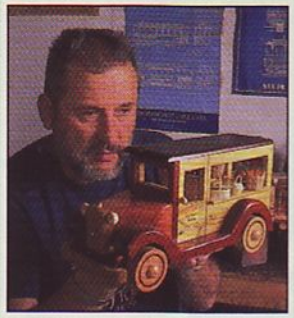
THE WORLD'S LEADING WOODWORKING MAGAZINE

This issue's cover wood grain: Idaho white pine *Cover photo: Wm. Hopkins*

AUGUST 1992 ISSUE NO. 53

WOOD PROFILE
Eastern white pine 35
Along the East Coast, early settlers harvested this all-around conifer for home construction, furnishings, and masts for their sailing ships.



CRAFTSMAN CLOSE-UP 37
Toys by Hank
Tugboats, trolley cars, and old-time trucks head the list of some very special creations by full-time toymaker Hank Gorczynski of Buffalo, New York. Discover how Hank manages his successful toy business in the highly competitive craft-show circuit.

SHOP-TESTED TECHNIQUES
For fun, try tin-punching 42
Learn how to make decorative tin panels for use in wall plaques, pie safes, bread boxes, and other projects. Get started with one or more of our five patterns.

NOW YOU CAN BUILD IT
Punched-tin pie safe 47
Add a touch of country to your kitchen with this showy project. Then, use it to store pastries, canned goods, or other kitchen-related items.

CARVING
Kachina doll 53
Carve and paint this colorful pendant representing a Hopi Indian deity.

BUYMANSHIP 54
Finish removers
Looking for the strongest finish remover, or the safest? *WOOD* magazine covers the field, testing a total of 59 paint-and-varnish removers from 18 manufacturers.

CARVING
Gardening with a gouge 60
While real flowers bloom and wilt, our carved daffodil lasts and lasts. It requires no sunlight or rain, only a little loving care in the crafting.

Back to school . . . for woodworking 64
Visit three contrasting schools that teach woodworking skills and/or help launch careers in the field. Then, see the companion piece listing 18 such schools from the United States and Canada.

DEVELOP YOUR SHOP SKILLS
The long and short of it 68
Take the wobble out of your legged projects and get them to stand on all fours with the leveling advice found here.

TURNING
Masterpiece music box 69
You'll come away singing after tooling this treasure. Measured cuts along the box side and top make room for beautifully patterned inlay pieces.

THE CRAFT SHOP
King of the caterpillars 72
Kids will love this critter to pieces, and why not? It's a puzzle. Just bandsaw or scrollsaw out the pattern inside, woodburn in the details, and it's ready to paint and finish.

Teddy bear in tin 74
Show your true colors by tin-punching our flag-waving teddy bear pattern. Then, surround your handiwork with a handsome painted frame. You will have to look long and hard to find a better accent for a young child's room. It's loaded with charm.

Wagons, ho! 76
Helping Mom and Dad pick up the toys around the house can be a chore for a youngster, but having a really neat wagon could make the job fun!

SHORT-SUBJECT FEATURES

Editor's Angle	1	Products That Perform	26
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Tips From Your Shop	18	Woodworking School Listing	90
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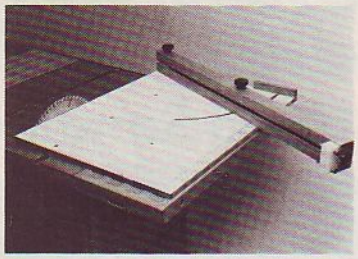

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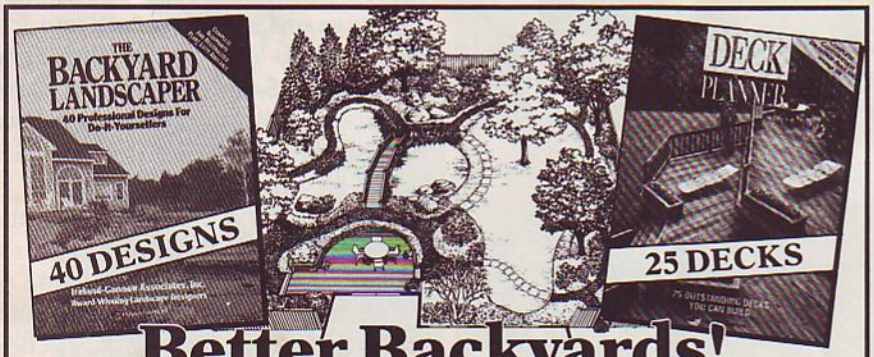

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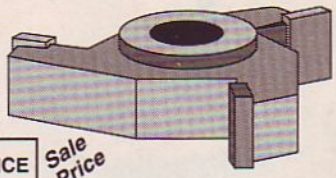

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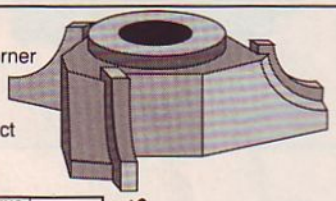

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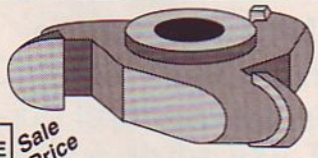

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TALKING BACK

We welcome comments, criticisms, suggestions, and even compliments. Send your correspondence to: Talking Back, Better Homes & Gardens® *WOOD*® magazine, P.O. Box 11454, Des Moines, IA 50336-1454.

Don't forget that label

The "Ask Wood" column of the February 1992 issue had a question about storing water-based finishes. I'd like to add that I purchase heavy-duty, clear-plastic containers at flea markets at reasonable prices in various sizes with tight-fitting lids. Prior to using any water-based finishes, I remove the labels to preserve them. I pour the finish into the plastic container, and then attach the label using a rubber band. When I use the finish, I remove the label for safekeeping.

—Gene Ciccone, Staten Island, N.Y.

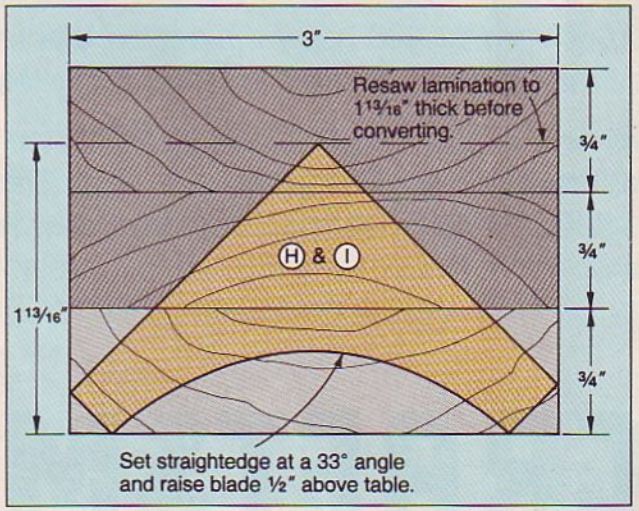
Good idea, Gene. And here's still another one. Use double-stick tape to attach a locking plastic bag to the side of the container. Then, just drop the label into the bag and seal it. That way it's always there and you never have to remove it for pouring.

Cove cost-cutting makes sense

Due to the price of fine woods, I must always look for cost-cutting factors. I noticed in your "Shelving Showcase" in the February 1992 issue that to construct the cove molding *(page 42)* you use three pieces of ¾" walnut lumber. Only one piece of the ¾" walnut is actually exposed. Wouldn't it be less wasteful to use only one piece of walnut stock and rely on pine or plywood for the other two layers since they aren't visible?

—George Stevens, Cochrane, Ont., Canada

Yes, George, we agree. Thanks for coming up with a helpful money-saving tip.



Continued on page 14

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TALKING BACK

Continued from page 12

High Chair Corrections

In building the high chair in the April 1992 issue, Jack E. Battalia of Portland, Oregon, caught several items we missed. They are as follows:

- Step 8 on *page 58* should read outside face up, not outside face down as stated.
- For a better fit, use ⅛" pilot holes and 3/16" shank holes for the drywall screws. These are slightly larger in diameter than the hole sizes dimensioned.
- The centerpoint for the back end of the ¼" strap slots on *page 61* should be 2⅛" from the back edge of the seat, not the 1¾" dimensioned (1⅛" plus ⅝").
- To prevent your router bit from dipping into the plug holes in the edges of the backrest stiles (H) when routing the ⅛" round-overs, plug the holes before routing.
- In step 5 on *page 61,* set your miter gauge 5° from center and not 10° from center when bevel-ripping the bottom edge of the backrest assembly.
- When attaching the armrests (L) to the top ends of the armrest supports (M), use one screw as shown in the Seat Assembly drawing and not two screws as shown in the accompanying detail. Also, for a smooth-sliding tray on the metal tray slides, make sure the armrests are parallel to each other.

Thanks, Jack, for your input. Although we reviewed the article numerous times and built two chairs to verify everything, a few errors snuck in and we apologize.

Timber producer deserves a medal

Your article in the February 1992 issue on the Anderson-Tully logging operation was very informative and timely. It seems to me the U.S. Forest Service and the loggers in the Northwest could take a lesson from this timber company that operates along the Mississippi River. Maybe those folks could keep their forest, jobs, and also the habitat for the spotted owl. I think this operation deserves some kind of medal. Companies with their level of concern are hard to find.

—Godfrey Klimesh, Calmar, Iowa

Extended saw table catches cut-offs, supports long work

TOP SHOP TIP

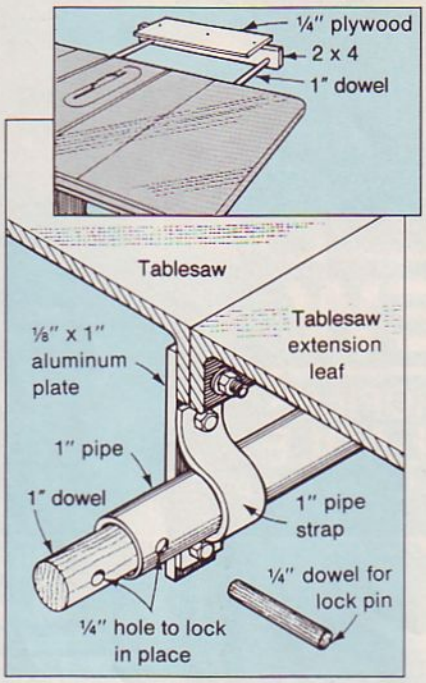
Cut pieces fall off over the back edge of most saw tables because of the limited area behind the blade. Woodworkers sometimes reach across the blade to grab the piece—a dangerous thing to do.

For his tip, Dave wins a Black and Decker Workmate 400, shown *right.*

TIP: Add a sliding extension to the back of your saw table. When pushed against the table edge, it will catch small pieces. Extended, it will support longer material.

To make one, start by cutting two pieces of plastic (or other) pipe long enough to extend from the front to the back of the table. Attach one to each side of the saw beneath the table with custom-built brackets. (See the drawing *right.*) Make sure that they don't interfere with the saw controls or limit blade tilt and elevation.

For the table, fasten plywood to a piece of 2 × 4 that's long enough to span the pipes, with an extra inch or so at each end. Then, cut two pipe-length dowels that fit snugly inside the pipes. Drill holes in the 2 × 4 to accept the dowels, glue the dowels into place, and then slide the table into the pipes. To lock the table in position, drill through the pipe and into the dowel, and insert a piece of ¼" dowel. For cutting heavy material, attach one or two legs to the back of the extension for extra support.



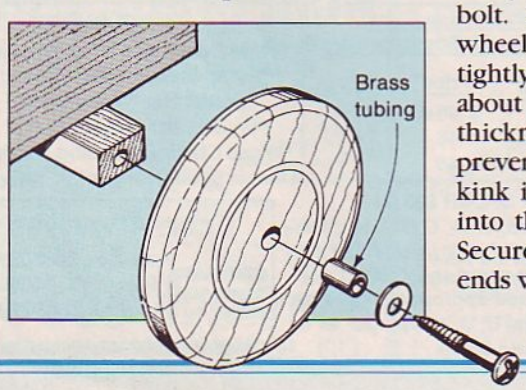
—Dave McFarlane, Fredericton, New Brunswick

Bushings take toys out of bush league

A wooden wheel mounted on a wooden toy with a screw or bolt eventually becomes wobbly as the metal axle wears the center hole to an ever-larger egg shape. The wheel could even split.

TIP: Keep those wheels turning with fewer problems by incorporating bushings into the wheels. Simply select a piece of brass or copper tubing that fits snugly but freely over your axle screw or bolt. Size the axle hole in the wheel so the tubing fits into it tightly. Press a piece of tubing about 1/16" longer than the wheel thickness into the axle hole. (To prevent the tubing from getting a kink in it, place the screw or bolt into the tubing as you press it in.) Secure the bushing by flaring the ends with a center punch.

—Howard K. Gaston, Naples, Fla.



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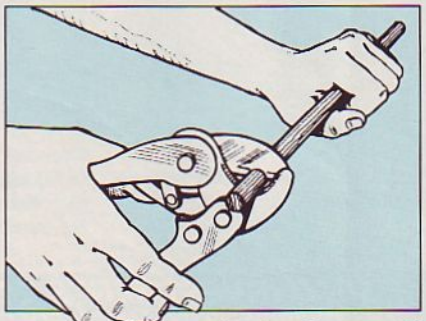
PVC-pipe cutter makes short work of short dowels

You can fiddle away a lot of time setting up jigs to cut short lengths of small dowels. Wouldn't it be great to have a simple way to snip off those little rounds?

TIP: Drop by a plumbing-supply shop or hardware store, and buy a PVC pipe cutter—the squeeze-handle type. With a razor-sharp blade and a ratchet mechanism with high mechanical advantage, this tool clips cleanly through dowels up to ½" diameter with little effort. A good one with metal handles will cut dowels for a long time to come.

—Charles Simpson, Guntersville, Ala.



Continued on page 20

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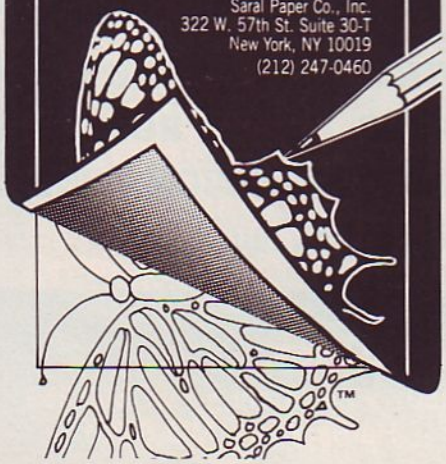
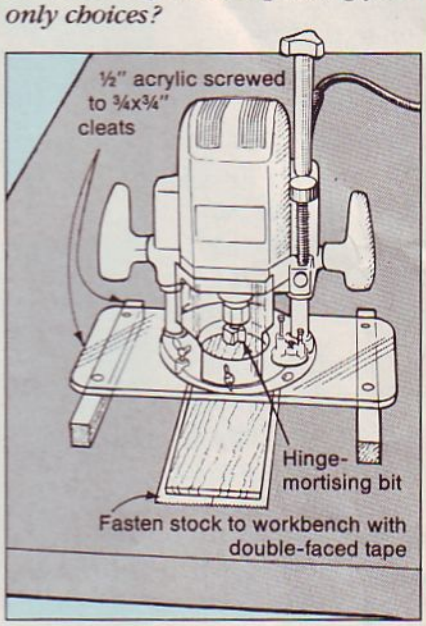


TIPS FROM YOUR SHOP (AND OURS)

Continued from page 18

Router stands in for a surface planer

You need a small piece of thin stock for a project, but not enough to justify the cost of a planer. Or, maybe you have a planer, but the piece you need to plane down is just too short to run safely through the machine. Are resawing or hand-planing your only choices?



TIP: Put your router on the job with an easy-to-build elevated base, shown *above*. Bore a 2" hole through the center of a piece of clear polycarbonate plastic or plywood as wide as your router's base and about twice as long. Attach the router over the hole on top of the piece with the handles aligned lengthwise. On the bottom, attach a 1×1×12" strip centered across each end.

Fasten the workpiece to a saw table or other flat, smooth surface with double-faced tape. Use plenty of tape, and tap the face of the wood after fastening it down to ensure a tight bond. Now, with a hinge-mortising bit in the router, adjust the depth of cut to skim off enough material to leave the thickness you need. If you need to remove a lot of material, take it in small increments.

—William Kappele, Mission Viejo, Calif.

Continued on page 22

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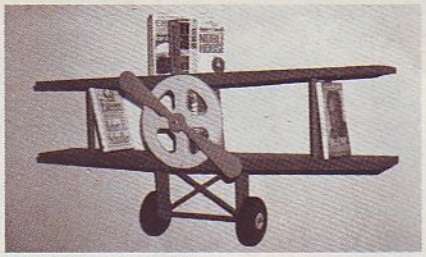

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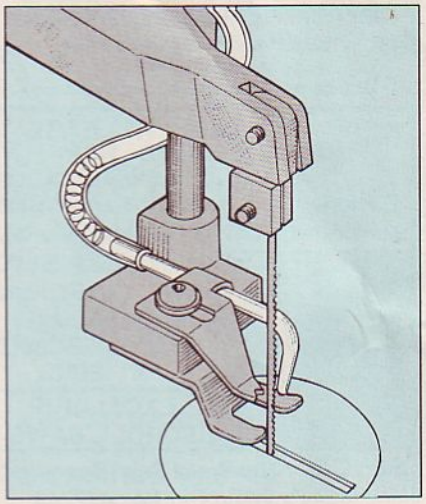
TIPS FROM YOUR SHOP (AND OURS)

Continued from page 22

Scrollsaw dust blower springs back into action

On some scrollsaws, the plastic tubing connecting the bellows to the dust-blower nozzle can kink. This restricts air flow, reducing the blower's usefulness.



TIP: Slide a spring from an old ballpoint pen into the tubing. Push it in far enough that the spring's middle falls at the middle of the curve where the kink occurs. The spring will prevent the tubing from collapsing, so you'll have full air flow to keep your pattern line clear.

—Paul Backer, Mason City, Iowa

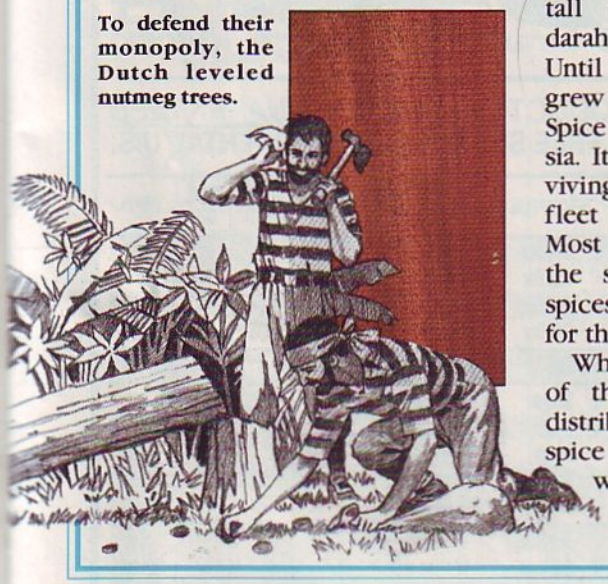
MORE TIPS FROM OUR WOODWORKING PROS

- Brush up on marking dowel joints with the photos and instructions on *page 48*.
- To make your project look old, check out the finishing techniques on *page 52*. For an additional old-time touch, refer to the Buying Guide on *page 51* for our source of steel cut nails.
- In our child's wagon article on *page 76*, we show you how to make a sturdy and attractive box joint. We also feature a jig that makes the job easier.
- You can make a quick country frame for anything from a photograph to a sampler with the instructions on *page 74*.

DARAH DARAH

THE SPECIES OF THE SPICE WARS

To defend their monopoly, the Dutch leveled nutmeg trees.



Custard and eggnog would taste pretty bland without the tangy spice we know as nutmeg. But if the Dutch had had their way centuries ago, these tasty treats would have to go it alone.

Nutmeg is the ground seed of a tall and handsome tree called darah darah (*Myristica fragrans*). Until the late 1700s, the species grew only in the Moluccas, or Spice Islands, now part of Indonesia. It was from there that the surviving ship of Ferdinand Magellan's fleet returned to Spain in 1521. Most of the crew had starved, but the ship's hold was laden with spices, especially nutmeg, destined for the wealthy.

When Portugal wrested control of the Moluccas, its merchants distributed false maps so that spice traders from other countries would smash on the coral shoals. Eventually, the Dutch claimed the islands from the Portuguese, and they cut down the darah darah trees on every island they couldn't defend. Carrying nutmeg seeds without authority even became punishable by death.

The Dutch hold on nutmeg lasted until the late 1700s, when the French planted smuggled seeds at their island colony of Mauritius in the Indian Ocean. When the British seized the Moluccas in 1796 and spirited away nutmeg seeds to Grenada in the West Indies, the spice wars ended.

Today, only the Moluccas and Grenada produce nutmeg. Because only the female trees bear fruit, growers harvest all males except a pollinating few. The easily worked, walnutlike wood becomes house framing, furniture, and millwork. But unlike globe-trotting nutmeg, darah darah wood remains mostly at home.

Illustration: Jim Stevenson

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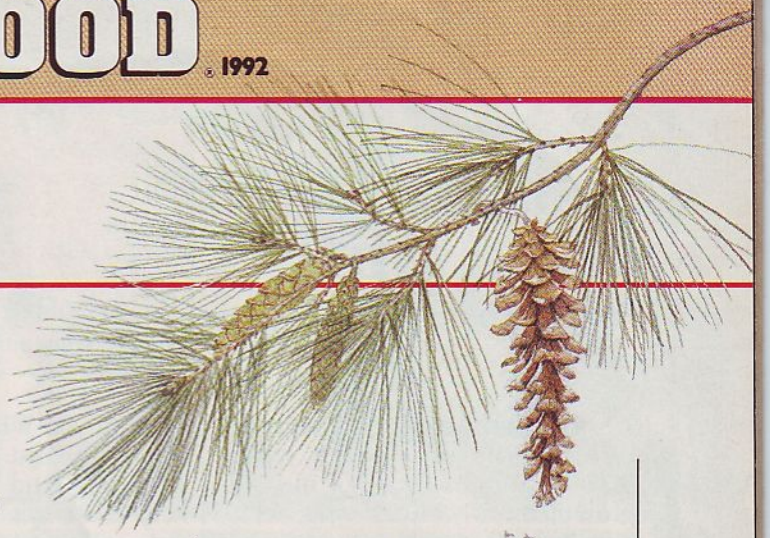


From coins to carpentry, it was colonial America's treasured tree

When the Pilgrims arrived at what was to be called Massachusetts in 1620, stands of tall, stout eastern white pine grew everywhere. In fact, adults could stroll easily beneath them without ducking, since the pines were often branch-free for 40′ or more of their 200′ height.

Even Captain John Smith noticed more than Pocahontas in the New World, and wrote at length about the great storehouse of trees, not the least of which was the eastern white pine. In fact, this same towering conifer was chosen as the symbol of wealth on the first coin minted in the New World—the Massachusetts Bay Colony's pine-tree shilling.

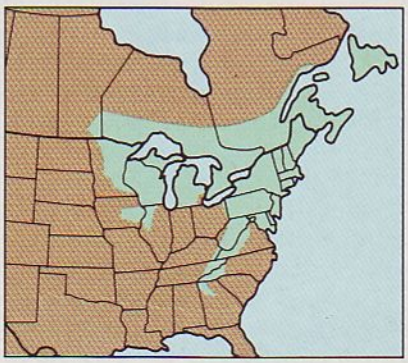
Once estimated as a resource of some three-quarters of a *trillion* board feet, the eastern white pine became a favorite of New England settlers. They felled the trees in great numbers for sailing-ship masts, charcoal, and other items of commerce. But most of the timber went into homes and furnishings.

Wood identification

Second only to California's sugar pine in size among the pines, the eastern white pine (*pinus strobus*), can, in old forests, reach 230′ heights and diameters of nearly 10′. Today, though, white pines grown for lumber rarely reach 100′ and a diameter of 2–4′ before harvest. Yet, in their natural range from Manitoba to New England and southeastern Georgia, they are the fastest-growing trees, shooting up 18″ per year.

The eastern white pine, sometimes called northern white pine and soft pine, prefers deep, sandy-loam soils, but will grow anywhere with sufficient moisture—often in pure stands. With its straight trunk, irregular crown, and horizontally layered branches, you can spot this monarch easily. Up close, look at the 3–5″ long, blue-green needles. They're in clusters of five. And the curved, narrow cones can be as long as 8″.

The soft, fine-textured, and straight-grained wood of white pine varies in color from creamy white to red-brown, with little distinction between earlywood and latewood. Even with a finish, it mellows with age to a pumpkin color. Light, it weighs about 25 pounds per cubic foot air-dried, but is no stronger than basswood. The least resinous of all pines, eastern white pine remains quite stable while fulfilling many construction and woodworking needs.



Natural range

Uses in woodworking

As did their pioneer ancestors, today's woodworkers can use eastern white pine for everything from house construction to furniture, carving to millwork, boats to musical instruments. And as "knotty pine," it's a favorite for bookcases and paneling.

Availability

Although the wide, clear boards of yesteryear's woodworking stock are very seldom available today, most wood retailers in the Midwest and East carry eastern white pine. Expect to pay $2 or more per board foot for furniture-grade. As ¾″ plywood, its cost can be $60 or more.

Continued

PERFORMANCE PROFILE

eastern white pine

(Pinus strobus)

Eastern white pine

It's true that America's settlers relied heavily on eastern white pine—mainly because of the old-growth trees' yield of long, wide, clear boards. Today, it's a different story. The biggest, oldest trees were cut long ago, and today's white-pine lumber comes from second-, third-, fourth-, and even fifth-growth stands. This means narrower boards with more knots. So, when you buy white pine:

- Ask for No. 1 Common and Better, or No. 2 Common grades. Similar to hardwood grades, these yield 66⅔ percent and 50 percent clear cuttings respectively (tight knots are allowed).
- Specify only kiln-dried (to 8 percent or less) white pine for your furniture projects. Why? Kiln-drying increases stability and sets the resinous pitch that otherwise can aggravate gluing, or bleed through a finish.

Machining methods

All pines are considered softwoods, but they actually fall into two categories: soft pines and hard pines. White pine lists as a soft pine, and it's easily worked with all hand and power tools. *Keep these tips in mind, however:*

- Eastern white pine has less pitch in its wood than other pines, but gum buildup on cutting edges still occurs. To avoid burning and blade wander from gum buildup when ripping, stop sawing after every 50′ or so to clean the saw's teeth with acetone and steel wool or oven cleaner. Better yet, make the switch to a Teflon-coated blade for this wood.
- The wood has little tendency to chip or splinter, so the only precaution necessary in machining white pine is to use a backing board when routing across the grain. If you'll be doing much routing, see the above note about gum buildup.
- Seal all knots in the wood with shellac before finishing to prevent bleed-through.
- When selecting a stain and clear finish, remember that white pine will naturally age darker.
- Even though white pine accepts stains better than most other pines, first use a wash coat of shellac thinned with denatured alcohol to prevent blotchiness.

Carving comments

- The difference in hardness (density) between earlywood and latewood is hardly noticeable when carving eastern white pine, a trait that also means that the wood can take fine detail.
- In thick carving stock, though, watch for resin that may bleed through a painted surface. Either let the completed carving season for a few weeks in a warm, dry place, or seal it with shellac before finishing.

Turning tips

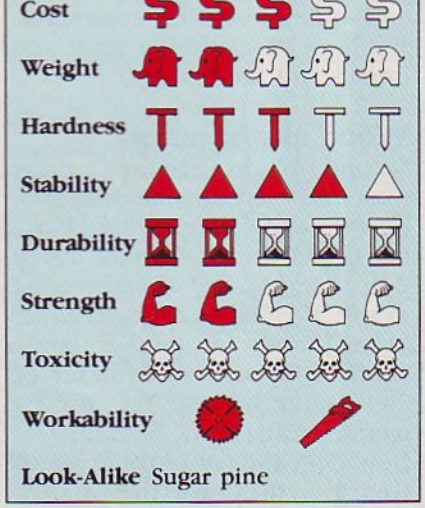
- As in carving, thick stock may contain resin canals in which the pitch has not set, and droplets may appear on the freshly turned surface. When dry, the hardened droplets can be scraped off.

SHOP-TESTED TECHNIQUES THAT ALWAYS WORK

Any exceptions and special tips pertaining to this issue's featured wood species appear under headings elsewhere on this page.

- For stability in use, always work wood with a maximum moisture content of 8 percent.
- Feed straight-grained wood into planer knives at a 0° angle. To avoid tearing, feed wood with figured or twisted grain at a slight angle (about 15°), and take shallow cuts of about 1/32″.
- For clean cuts, rip with a rip-profile blade with 24–32 teeth. Smooth cross-cutting requires at least a 40-tooth blade.
- Avoid drilling with twist drills. They tend to wander and cause breakout. Use a backing board under the workpiece.
- Drill pilot holes for screws.
- Rout with sharp, preferably carbide-tipped bits and take shallow passes to avoid burning.
- Carving softwoods generally means fairly steep gouge bevels—20° or more—and deeper cuts.

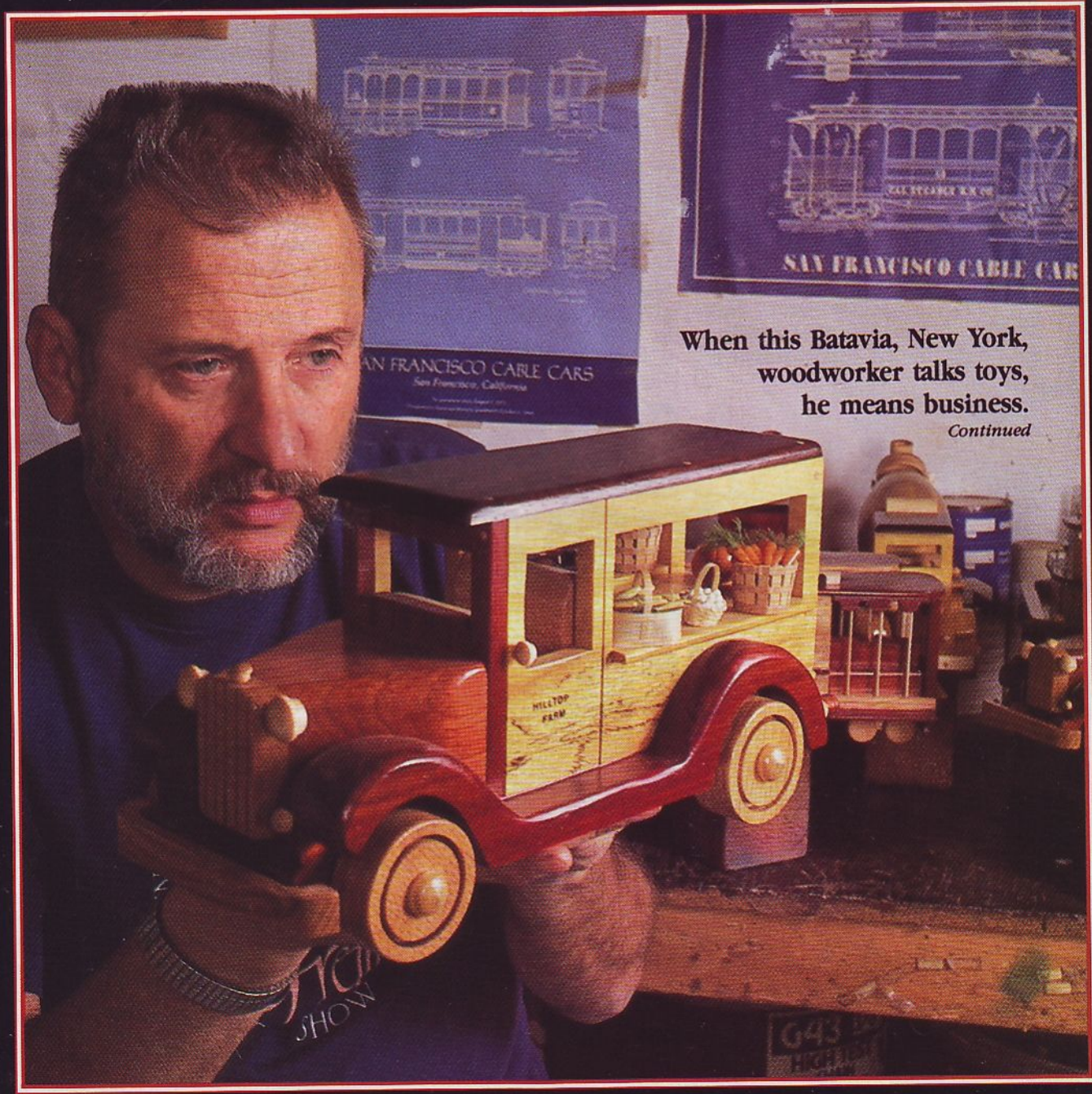
E. WHITE PINE AT A GLANCE



Look-Alike Sugar pine

Compiled with woodworkers Jim Boelling, Tom Becraft; carver Harley Refsal Photos: John Hetherington Illustration: Steve Schindler

TOYS BY HANK



When this Batavia, New York, woodworker talks toys, he means business.

Continued

TOYS BY HANK

"I don't make one-offs. I build 18 to 20, maybe two dozen at a time," says Hank Gorczynski of his line of wooden toys. The 50-year-old woodworker sits on a stool by his workbench, carefully sanding a foot-long model of a 1931 Ford huckster.

After a minute, he sets it down, picks up a glass of ginger ale, and continues. "Before I start building, I figure out how many it takes of each model to carry me through a show. Right now, if I had a full inventory, I'd have well over 600 toys boxed up—in 24 to 27 different models!" Now, that's talking business.

Comfortable in his knit pullover sweater, Hank exudes the confidence that comes with hard-won success. And why wouldn't he? Over the last 20 years, he's built a full-time, self-supporting business based on designing, building, and selling wooden toys. But bringing $85 or more apiece, these pricey playthings definitely aren't destined for the toy box. They're collector's items.

From parcels to playthings

Twenty years ago, Hank wore the dark brown uniform of the United Parcel Service. He admits he made good money, but had little time he could call his own. And, frankly, he had always dreamed of working for himself.

"Sometime during the Christmas holidays in 1970, my sister-in-law visited from Baltimore. She was always into crafts, and as we were talking, she suggested that I try making wooden toys because they seemed to be selling well," recalls Hank. "I said I'd give it a try. The next day I went to the lumberyard and bought some redwood."

Back then, Hank's hobby was assembling scale-model kit cars—from metal! So he didn't have a shop full of woodworking tools. Fortunately, among those he did own were a coping saw and an electric drill.

"At first I made some crude silhouette toys with wheels," he says, "but even they sold for a few bucks apiece. So, I bought a scrollsaw and started making more of them. There was a train set that sold for $15—and that was a hot item. Then, I got into some bigger things, all pine now, and geared for children. I even had a set of little cars that came with a gas pump. People told me that their kids would play with those all day."

As Hank's woodworking skills improved, so did his sales and his business sense. But most important, so did his toys.

"I started staining a few of the better models I made, and added a clear coat of urethane to them," Hank remembers. "That brought their price up to about $45. And what's funny, I noticed more women than ever were buying them. They weren't buying for children, but as collectibles."

Finally, in 1976, Hank turned in his UPS uniform. "It took six years to build up my confidence

A cement truck like this won Hank a prize in *WOOD*® magazine's 1991 Build-a-Toy contest.

enough to go on my own," he says. "It wasn't easy, and it still isn't. There's no guarantee in this business. It's tough, but it's what I want to do."

Building what sells

In parade lineup, a full inventory of Hank's toys could practically stretch from goal line to goal line of nearby Buffalo's Rich football stadium. To see all those boats, planes, trains, trolleys, cars, and trucks spread out like that, you'd think there was absolutely nothing Hank couldn't build, and you'd probably be right. But there are things he *won't* build.

"Cars and trucks, as long as they have flat windows, you don't have to worry. They're buildable," he explains. "But in wood, you can't get into any models newer than the early forties. That's because they have too many curves: windows, fenders, flares. Forget it. For ease of cutting and building, you want rectangular, boxy shapes."

"Don't get me wrong," Hank cautions. "You *can* make later model, more rounded vehicles, but you'll never get your money out of them. For instance, I know of a guy who makes Corvettes from wood, and gets $1,500 each. But he doesn't go around doing arts- and-crafts shows with those. If you want to spend the time, you can make any vehicle. Then, though, you have to get big bucks out of it, and there aren't that many people willing to pay the price."

So how does Hank make sure he never runs out of buildable, salable ideas? To fire his imagination, Hank dives into file drawers full of old car calendars and clippings of automotive advertising from yesteryear. He also attends antique car shows frequently, although not as a collector.

Hank uses templates to help him lay out the parts for a trolley car. With track, his trolley will bring $125.

"I grab a camera and get maybe six shots of a car or truck I think would be good to make. You need all of the views you can get," he says. "In fact, when people give me a commission to make a special vehicle, I ask them for lots of photos. And you know, there's a good number of car collectors out there."

Home on the assembly line

"One time, my neighbor asked me to rip a sheet of plywood for him. I had to turn him down because I don't have a way to do it," says Hank. "My shop is set up for small parts."

The toymaker's shop is actually two rooms in the basement of his ranch house. The larger room, about 18×25′, contains the stationary power tools. Next to it, a shorter, narrower room houses a long assembly bench, file cabinets, and storage shelves. "I do my finishing here, too, with spray Deft," Hank adds.

The layout of the larger room exemplifies a well-planned workshop. In the center of the room Hank lined up his machines in a bank—from the bandsaw at one end to the planer at the other. In between, there's a tablesaw, inflatable sanders, and a router table. For a cleaner work environment, Hank connected the machines—via metal duct—to a central dust-collector.

Continued

TOYS BY HANK

"My Makita planer is the handiest machine I've got in the shop," says Hank. "That's because I resaw a lot, starting with five-four (1¼") stock. Then, I run the resawed boards through the planer to finished thicknesses of ¼", 3⁄16", 7⁄16", and ¾"."

Resawing demands a lot of time at the bandsaw, and there Hank has developed his own technique. "I guess I'm pretty much an unorthodox woodworker," he says, grabbing a 1¼" walnut board and stepping up to the bandsaw. "I don't believe in using a fence. Instead, I use my thumb and index finger as guides when I resaw. The trouble with a fence is that pressure from it on the wood, combined with blade wobble, gives you a slightly wavy cut. So, I just draw a line down the length of the board, then follow it by eye." *(Note: WOOD® magazine recommends not using this technique.)*

Hank, of course, relies little on pine these days. His toys feature naturally colorful tropical woods or exquisitely figured native ones. "There are about eight to 10 tropical woods and three native woods I use now," he says. "Among them are padauk, zebrawood, lemonwood, satinwood, rosewood, lacewood, purple heart, goncalo alves, walnut, oak, and, of course, curly maple. And I often laminate them."

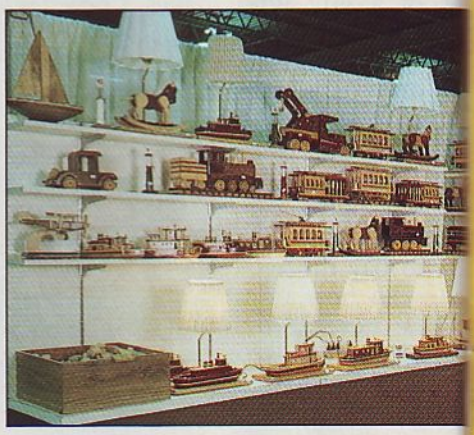
Hank also gives his bandsaw a workout crafting his secondary line—wooden nameplates. "Back in 1977, I decided I needed a crazy item to augment my toys at crafts shows. You know, the kind of thing you can sell for a couple of dollars. Well, I did first names, and sold them for $3. They went over big. Now, they're $5, no matter how long the name. The longer the name, the better the deal. I'll sell more names at a show than someone who sells by the letter."

For nameplates, Hank works common pine. "I just rip a 1×6 board down the middle and use the halves cut to length. There's not much waste, and I can bandsaw about 35 names an hour."

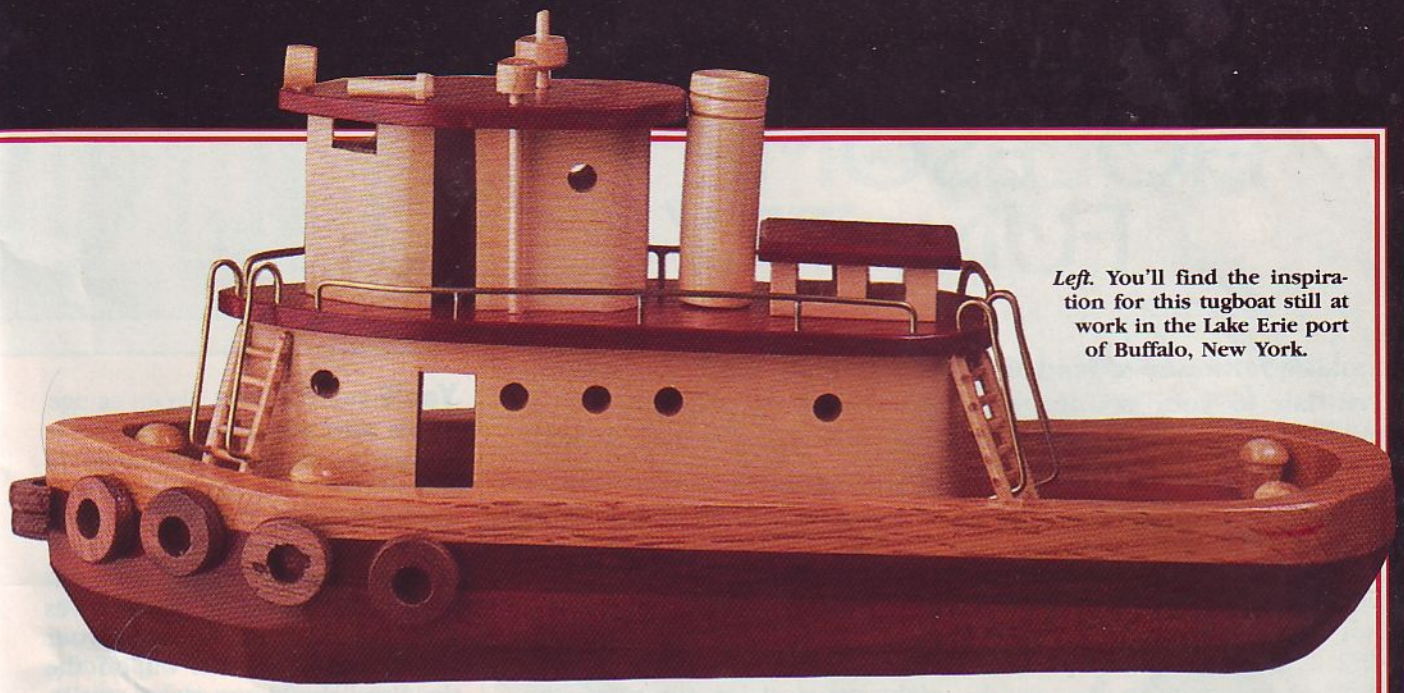
Have toys, will travel

When he turned pro, Hank had to learn what every full-time woodworker finds out: for every hour you spend in the shop, you have to spend at least another one selling. And for Hank, that means hitting the road.

"I've been doing 20 to 23 arts-and-crafts shows a year, but eventually, I'll be cutting back," he says. "For one thing, I don't like summer street shows out in the heat. The way it is now, my business generates from May through November, with June and September being my best months.



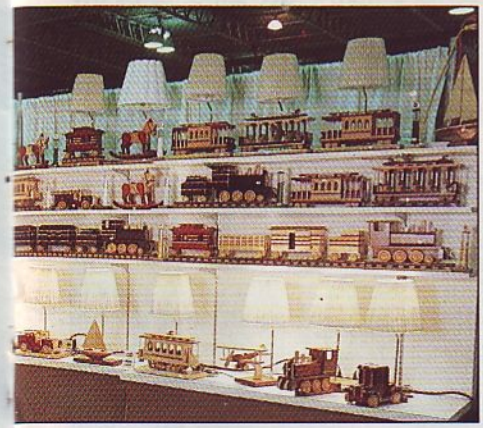
Left. **Hank resaws all his wood at the bandsaw minus its fence, a technique *WOOD* magazine can't recommend. He believes that he gets a straighter cut.**



Left. **You'll find the inspiration for this tugboat still at work in the Lake Erie port of Buffalo, New York.**

That means that during the summer I'm often gone seven weekends in a row, with a total of five days away from the shop for each trip. January and February are the only months I'm around home for any length of time."

Hank drives to each show in a full-sized van loaded to the roof, usually spending six to eight hours on the road to get there. And there's no guarantee he'll recover his expenses, let alone make a profit. "To go to a good show, with fees, travel expenses, and everything, I could have $800 tied up in a weekend and not know if I'll make even that amount back in sales," Hank says.



Above. **Hank's booth appeals to the kid in everyone. "In fact," says Hank, "about 25 percent of my sales I can attribute to the look of my booth."**

Talking it up on the road

What about selling wholesale and skipping all the travel? Hank will tell you that wholesale has its own rules of the road. "If you sell wholesale, you have to stay home and produce to get the volume needed to make up for the 50 percent lower selling price. So, if you want to get full price for your work, you have to produce at home, then take it on the road to sell."

With the caliber of design and craftsmanship Hank brings to his creations, you'd think he'd have to turn customers away. But he'll tell you that it's not that easy.

"Today, people pay $5 to $6 to come through the show gate, and most of them don't know what they're looking at in terms of quality." Hank laughs, "I've had people come up and ask me 'Where do you buy this stuff that you're selling?' And some think I've made them from kits! So I have my pitch. First of all, I have to explain the exotic woods that I use—most people think the toys are either painted or stained." Again, Hank chuckles recollecting. "Then, I have to point out where the woods come from—the different countries and where they are—and how I finish my toys, and all the rest that goes into it."

"But I guess the thing that really gets me—and it never fails to happen at each show I go to—is the man and woman who will typically look over my things carefully. The couple will seem real interested, especially the woman when I explain the woods and their expense. Then I'll hear the husband say, 'Oh, Honey, I can make you one of those little things in no time at all.' " Hank shakes his head as a sign of dismay. "Like I said before, this life isn't easy."

WRITE TO HANK FOR A BROCHURE

For your copy of a brochure describing Hank's toys, send a self-addressed, stamped, business-sized envelope to: *Batavia Wooden Toys, 12 Fordham Dr., Batavia, NY 14020.*

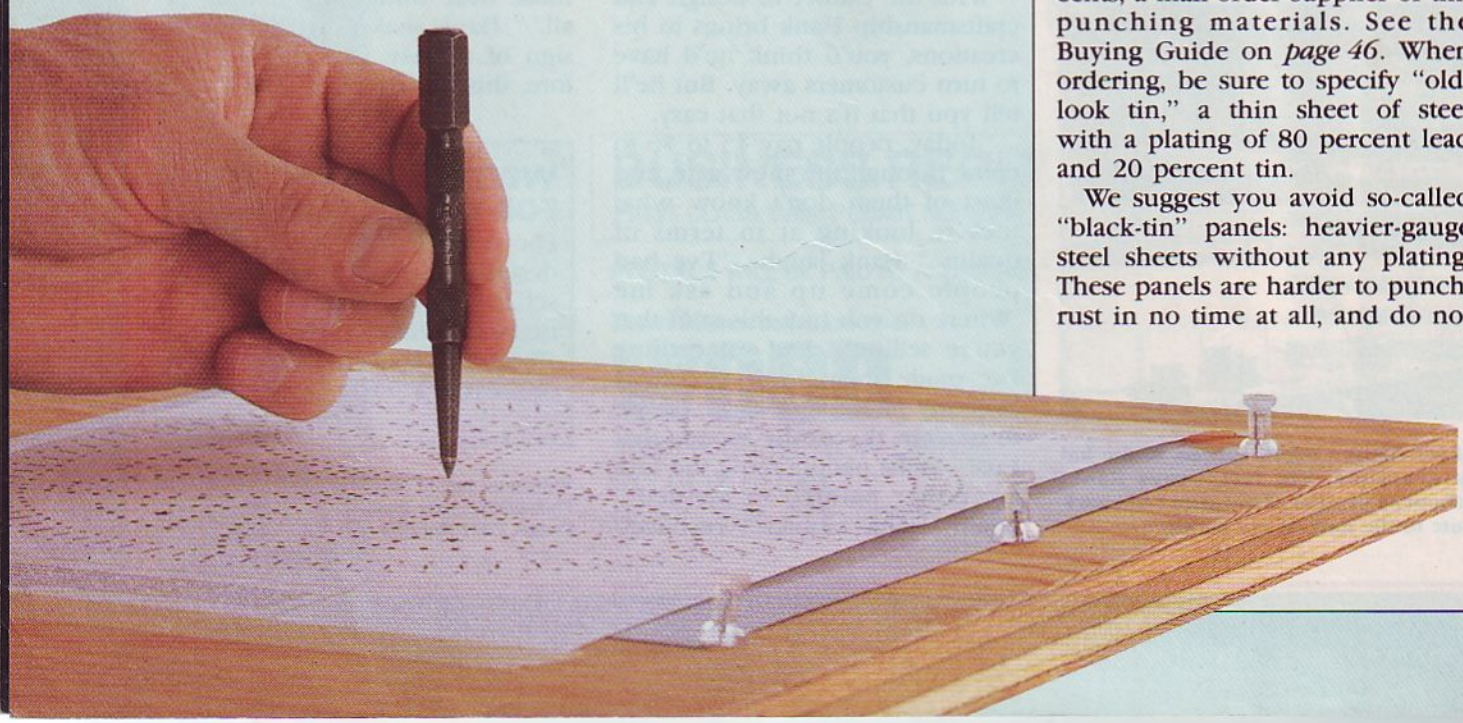
Written by Peter J. Stephano
Photographs: Jerry Irwin
Design: Perry McFarlin

FOR SOME "HOLESOME" FUN, TRY TIN

Looking for a way to lend an authentic appearance and distinctive flair to your country-style woodworking projects? Then, welcome aboard! Tin-punched panels will make most any project look as though it hails from the 1800s.

Before the turn of the century, punched-tin panels not only were decorative, they were downright practical. In pie safes, the panels allowed air to circulate around the food while keeping flies out. Lanterns also were fashioned from punched-tin panels that allowed light beams to pass while blocking the wind and preventing it from blowing out the candle.

The simple technology and tools for punching tin have hardly changed since those days. But as we discovered while punching tin in the *WOOD®* magazine shop, there are plenty of little tricks you can use to guarantee a high-quality end product.



You'll need these tools and supplies

To get started, you may need to run out to your local grocery or hardware store for several items not found in most workshops:

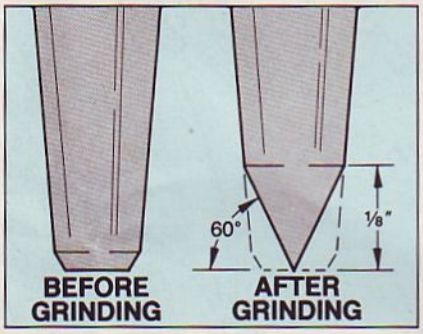
- White cotton gloves for handling the tin panels. The gloves keep the tin's lead plating off your hands and your skin oil off the tin. Keep the gloves clean of oils.
- Pushpins (like those in the photo *below*) for holding the tin in place atop a scrap of ¾" plywood.
- Distilled white vinegar. The acid in vinegar dulls and darkens the lead in the tin plating to give the panels an aged look. One quart goes a long way.
- A 2"-or-wider foam brush for applying the vinegar.
- Semigloss or satin spray lacquer or polyurethane for sealing in the lead and protecting the punched and aged panel.
- Tin panels. It's difficult to find tin locally these days, but you can order tin panels from Country Accents, a mail-order supplier of tin-punching materials. See the Buying Guide on *page 46*. When ordering, be sure to specify "old-look tin," a thin sheet of steel with a plating of 80 percent lead and 20 percent tin.

We suggest you avoid so-called "black-tin" panels: heavier-gauge steel sheets without any plating. These panels are harder to punch, rust in no time at all, and do not

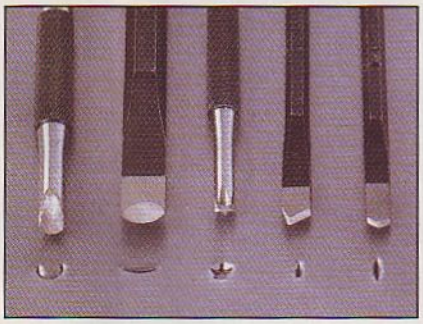
PUNCHING

age as nicely as old-look tin. Likewise, you can purchase other sheet metals, such as galvanized steel and aluminum flashing, locally at relatively low prices, but these products will not give an authentic punched-tin look.

● Punches. You can make your own punch for round holes by grinding a 1/16" nail set according to the before-and-after illustration *below*. With just this one tool you



can punch many patterns, but some designs require more varied tool tips such as those shown *below*. Grinding these shapes into various punches and chisels yourself can be difficult, if not impossible, so you're probably better off ordering them (see the Buying Guide on *page 46*).



A sampling of specialty punches and the holes they make. From *left:* C chisel, curved chisel, star punch, willow punch, and lampmaker's chisel.

Start by preparing the tin panels

After your tin panels arrive, you'll notice that they have a light protective coating. Clean this away from both sides of the panel, using a rag dampened with mineral spirits or lacquer thinner as shown on *page 45*.

Then, lightly and evenly scuff both surfaces with 0000 steel wool. Be careful not press too hard with the steel wool. Otherwise, you might put some scratches in the panel. Because the steel wool contains oil, you need to wash both sides of the panel with dish-washing soap after scuffing. Rinse away all traces of the soap with water.

From here on, you must be careful not to get any fingerprints, oils, or dirty smudges on either side of the panel. These contaminants may cause a splotchy appearance during the aging process, so remember to wear white cotton gloves whenever you handle the panel.

Now, age the panels for that authentic look

At this point the tin panels look too shiny, so you need a way to dull and darken the surface. Here's a simple method.

After spreading some newspapers over your work surface, pour some vinegar into a clean, shallow container (a tuna or cat-food can works well). Saturate a foam brush with vinegar, and apply the vinegar to the panel in straight, overlapping strokes as shown *below*. Do not rebrush the vinegar once you have applied it. Work quickly and pause no longer than a second or two between strokes. Otherwise, the vinegar will react unevenly with the metal plating to create a streaked appearance. Leave the vinegar undisturbed for five minutes, then rinse the panel with running water and dry it with a clean, soft rag.

Repeat this procedure on the other side of the panel. Be careful not to get any vinegar on the side you just completed.

Continued

For an evenly aged panel, generously apply the vinegar in quick, overlapping strokes. Be careful not to allow vinegar to leak onto the opposite side of the panel.

Next, prepare the tin panel for punching

Before you start punching, you need to position the panel and pattern on a sturdy base of plywood that's larger than the panel by at least 1" all around. Because tin panels are cut from large rolls, they tend to have a slight bow. Place the panel, with the peak of its bow up, onto the base. The punching tends to counteract the panel's bow, and may actually cause it to bow the other way. After punching each panel, you'll need to punch the next panel over a new portion of the base.

Try to avoid low-quality plywoods with lots of voids beneath the surface. If you punch into one of these voids, the punch tip will go deeper than intended and create a hole that's too large.

Secure the tin panel to the base with at least six pushpins (see photo on *page 45*). Now, center the pattern on the panel and adhere it with masking tape.

Woodworkers, start your punches!

You can start punching at any place on the pattern; just keep track of what holes you punch so you don't accidentally punch the same ones twice. Most patterns have both large and small round holes, but you can make both hole sizes with the same punch. Just strike the punch harder for the larger holes. Remember to punch all the holes of one size before punching all of the holes of another size. This will help you punch consistently sized holes. We had smashing good success with a 16-oz. hammer.

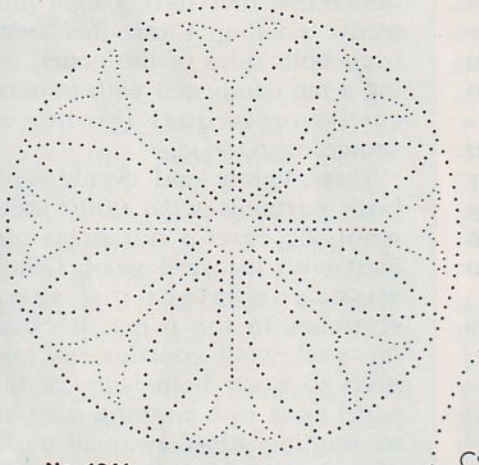
As you punch away, take your time and concentrate on cleanly striking the punch. If the hammer deflects off the punch, it will either strike your hand (ouch!) or put a dent in the panel (drats!). You also can lessen the chances of hammer deflection by grinding flat the head of the punch when it starts to mushroom from repeated hammer blows.

5 GREAT DESIGNS FOR YOUR TIN-PUNCHING PLEASURE

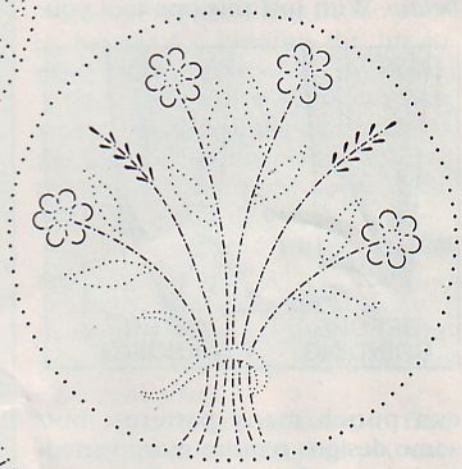
We thought you would like some design options for the 10×10" panels in the pie safe on *page 47*, or some other project you have in mind. So, we had the five original patterns *below* drawn up. You can order full-sized patterns for $1 each and make your own copies (you need one pattern for each panel). Or, send $3.50 for four copies of one design or one copy each of four different designs.

PATTERN POSSIBILITIES

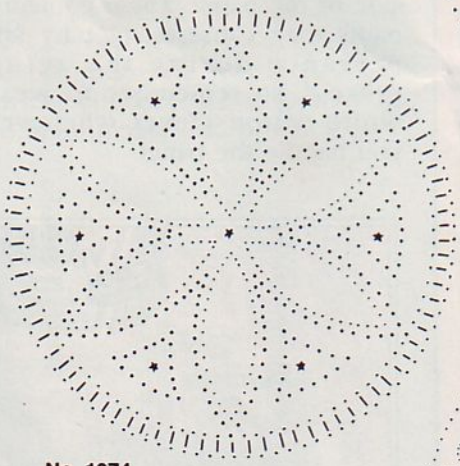
All patterns require a sharpened 1/16" nail set. Required special tools are noted next to pattern. See Buying Buide on page 46 for prices.



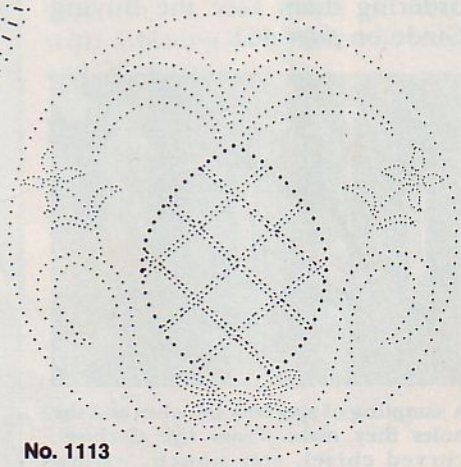
No. 1041



No. 1042-C
Special tools required:
T-0259 mini chisel
T-0459 5/16" "C" chisel
T-1181 willow punch

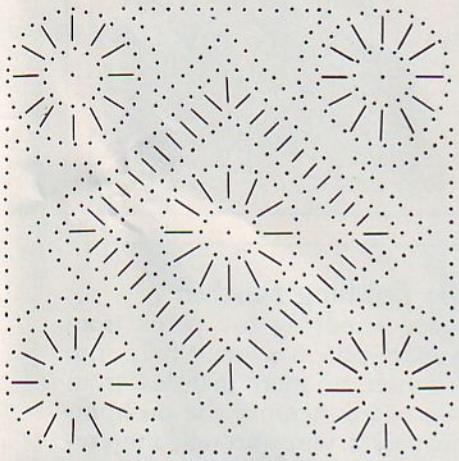


No. 1074
Special tools required:
T-0259 1/4" chisel
T-0759 star punch



No. 1113

Note that three of the patterns require special tools other than a sharpened nail set. To order, send a stamped, self-addressed, business-size envelope to the Country Accents address on *page 46*.

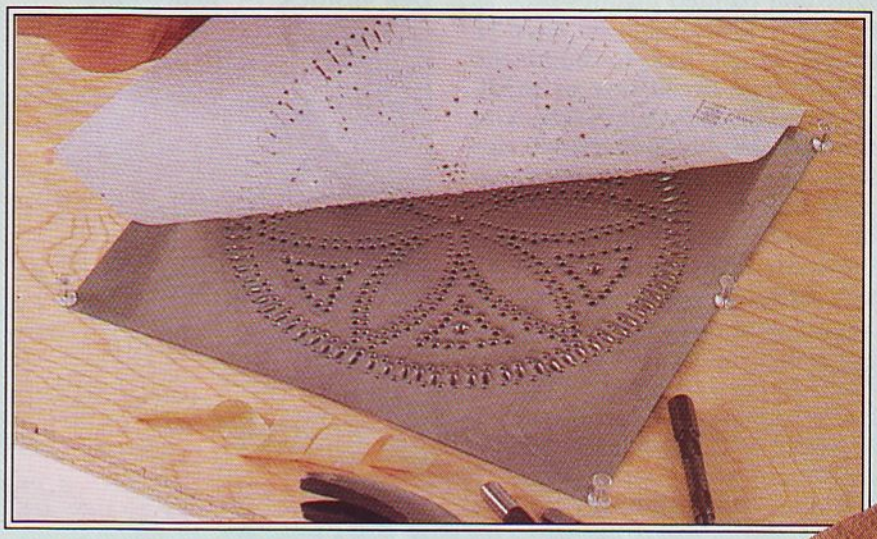


No. 1017-A
Special tool required:
T-0259 7/16" chisel

Even a simple panel can take 20 minutes or so to punch, and your eyes and arms can become quite fatigued. We found that the longer we worked, the more mistakes we made, so for best results we suggest you take good, long breaks between panels.

After you've finished the punching, remove all but one of the pieces of masking tape holding the pattern in place. Lift the pattern up, and inspect for any missed holes as shown *below*. If necessary, replace the pattern.

Continued

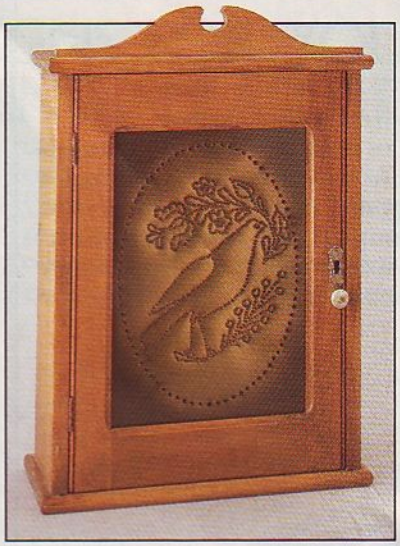


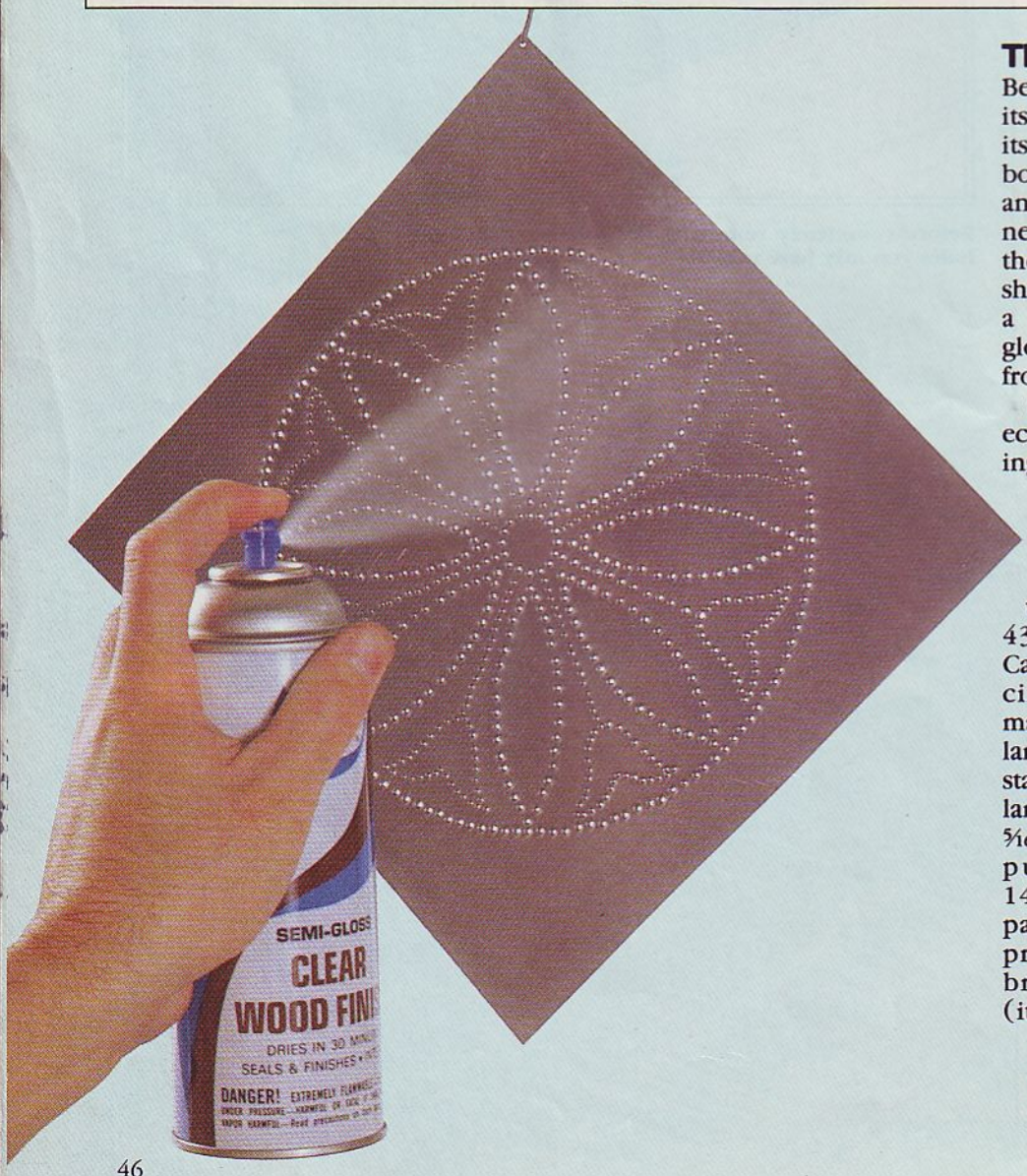
Before completely removing the pattern, check for holes you may have missed.

A FEW OTHER PROJECT POSSIBILITIES

Although punched-tin panels show up mostly in pie safes, you can use them in a variety of other projects such as kitchen cabinetry, buffets, dry sinks, back-lit signs, and painted plaques such as the Teddy-Bear design on *page 74*. If you would like to build the country-style bread box or medicine cabinet shown at *right*, you can buy prepunched panels for these projects from Country Accents (see the Buying Guide *below right*). And, we'll send you plans for either project for $2 each ($3 for both). Just send a self-addressed, No. 10-size (4×9½") envelope, and a check or money order to:

Terrific punched-tin patterns
***WOOD* Magazine®**
Box 11454
Des Moines, IA 50309-1454





The finishing touches

Before removing the panel from its base, punch a small hole into its corner, no more than 1/16" from both edges. Remove the pushpins and pass a wire through the corner hole. Use this wire to suspend the panel for spray finishing as shown at *left*. Apply two coats of a clear finish (we prefer semi-gloss or satin finishes) to both the front and back of the panel.

See *page 50* of the pie-safe project for a typical means of installing a punched-tin panel.

Buying Guide

• **Metal panels, punching tools, and punched-tin patterns.** Country Accents, Box 437, Montoursville, PA 17754. Call 717/478-4127. Prices for specific items: T-0259 7/16" lampmaker's chisel, $7.85; T-0259 ¼" lampmaker's chisel, $5.95; T-0759 star punch, $18.90; T-0259 mini lampmaker's chisel, $4.95; T-0459 5/16" C chisel, $11.90; T-1181 willow punch, $9.85; prepunched 14×10" zinc-plated bread-box panel (item RP-1108), $17.80; prepunched 10×14" antique-brass medicine-cabinet panel (item RP-1166), $35.75.

Written by Bill Krier with Jim Boelling
Photographs: Scott Little
Illustration: Kim Downing

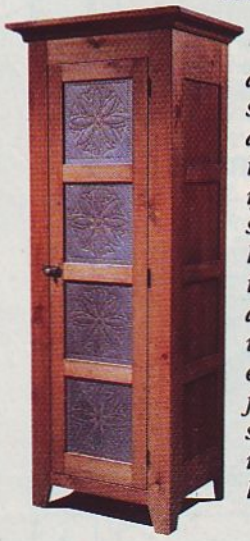
PIE SAFE

JUST LIKE GRANDMA USED TO HAVE

Long before iceboxes became a common household item, frugal homemakers everywhere stored their breads and pastries in a pie safe. The pie safe's decorative punched-tin panels allowed ventilation that retarded molding, and protected baked goods from flies and rodents at the same time. It also added a little spice to the kitchen's decor.

Our 14×20×59¼" pine replica does the same thing, but as you can see, it holds a lot more than pies and pastries.

Note: *Unless you already know how to punch tin, see the preceding technique article for our step-by-step instructions. Also, take a look at the Buying Guide at the end of this article for our source of blank and prepunched tin panels. Or, if you want to save a few dollars (and obtain a little different look), use wood panels in the side-frames, where shown in the inset photo at left.*



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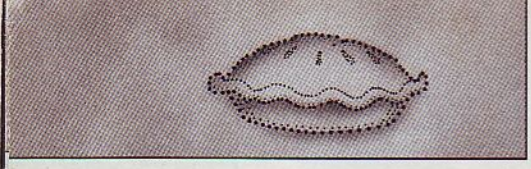


Begin with the face frame

1 From ¾"-thick kiln-dried pine (we used #2 common), cut the two stiles (A), top rail (B), and bottom rail (C) to the sizes listed in the Bill of Materials.

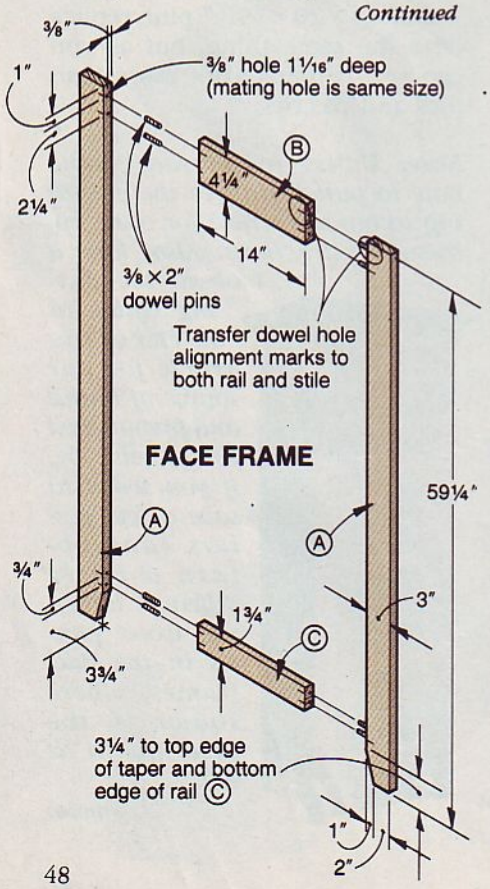
2 Taper-cut the bottom inside edge of each stile (A) where shown on the drawing *below*.

3 Lightly dry-clamp (don't glue) the rails between stiles where shown on the Face Frame drawing *below*. Then, using a square, carefully make the dowel-hole alignment marks where dimensioned on the Face Frame drawing and as shown in Photo A. Remove the clamps.

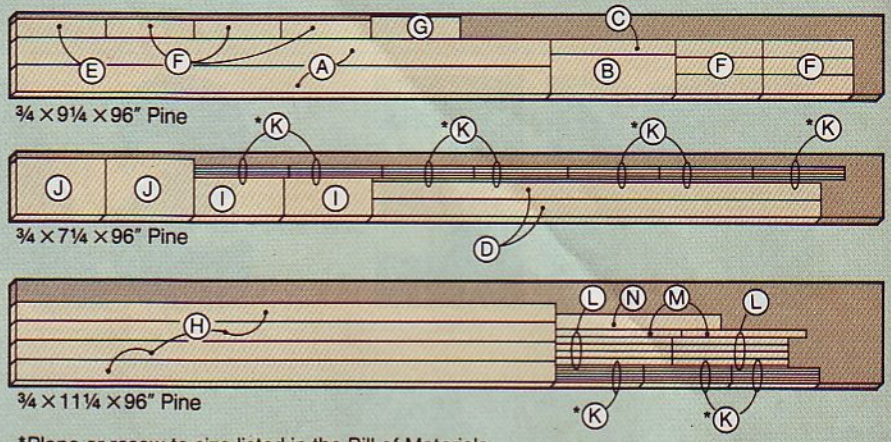
4 Align a doweling jig with the marked centerlines, and drill ⅜" holes 1 1/16" deep as shown in the Photo B. (We wrapped masking tape around our drill bit to make sure we drilled all holes to the same depth.)

5 Glue, dowel, and clamp the rails between the stiles. Check for square, and make sure that the assembly lies flat. Wipe off the excess glue with a damp cloth.

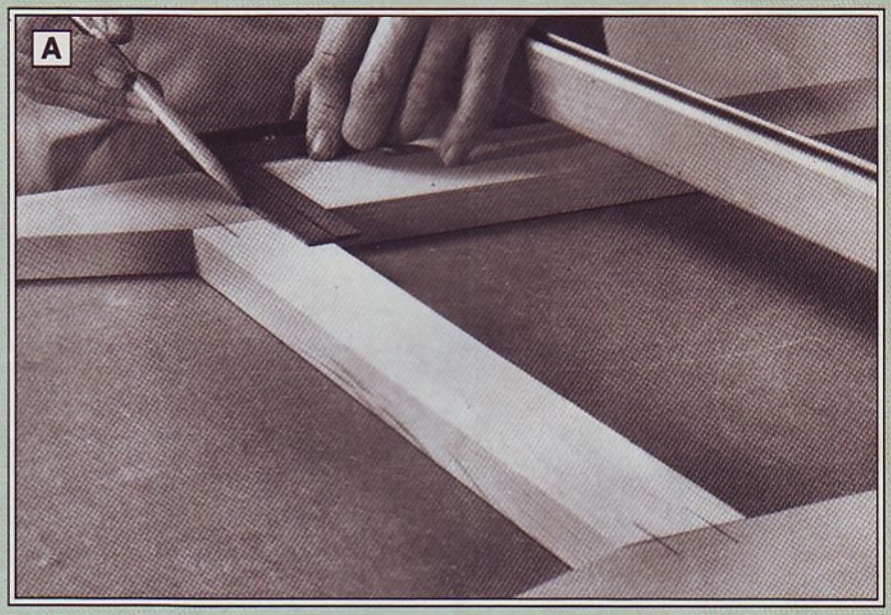
Continued



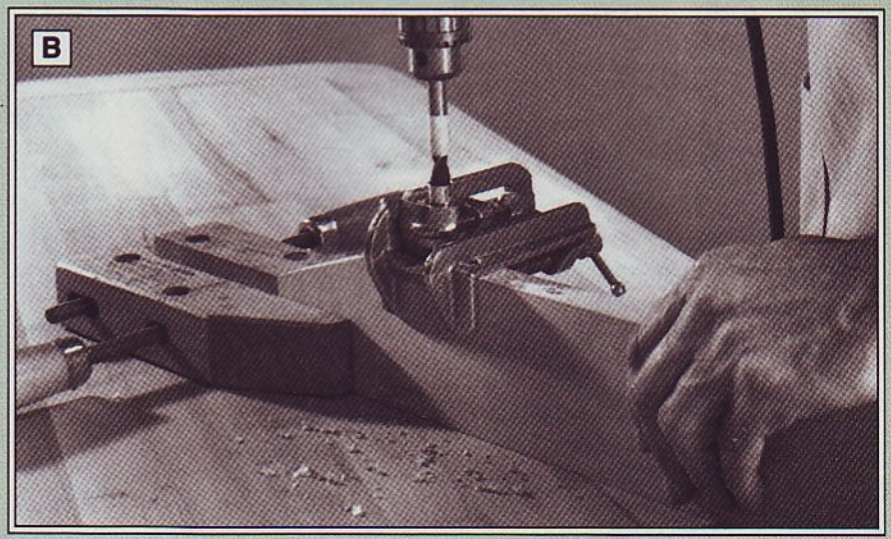
CUTTING DIAGRAM



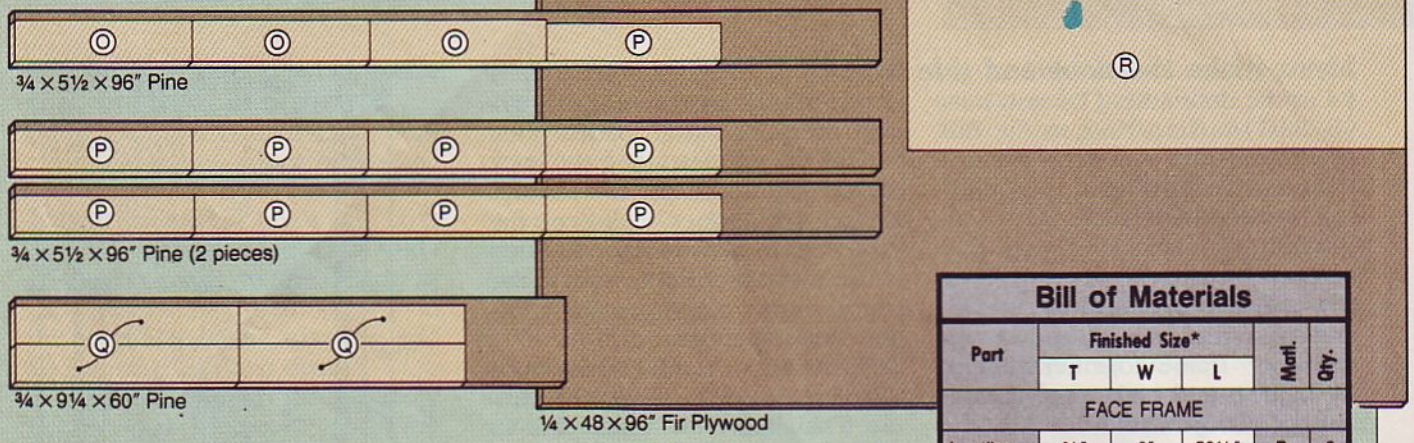
*Plane or resaw to size listed in the Bill of Materials

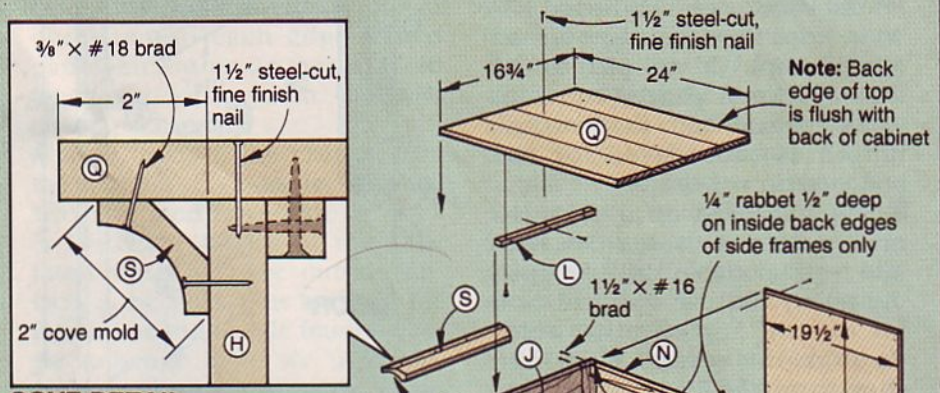


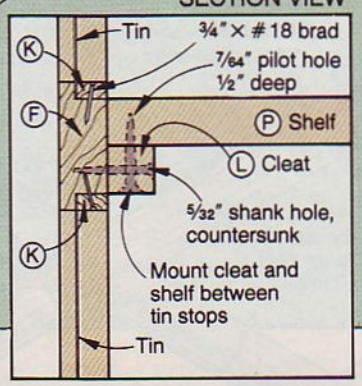
Dry-clamp the frame pieces, and use a square to make the dowel-hole alignment marks on both mating pieces.



Using a doweling jig for proper alignment, drill ⅜" dowel holes 1 1/16" deep in the face frame pieces where marked.







Bill of Materials

Part	Finished Size* T	W	L	Matl.	Qty.
FACE FRAME					
A stiles	¾"	3"	59¼"	P	2
B rail	¾"	4¼"	14"	P	1
C rail	¾"	1¾"	14"	P	1
DOOR AND SIDE FRAMES					
D stiles	¾"	2⅛"	49¾"	P	2
E rail	¾"	2⅛"	9½"	P	1
F rails	¾"	2¼"	9½"	P	9
G rail	¾"	2⅞"	9½"	P	1
H stiles	¾"	2¼"	59¼"	P	4
I rails	¾"	4¾"	9½"	P	2
J rails	¾"	6½"	9½"	P	2
K* stops	¼"	½"	10"	P	48
CLEATS					
L shelf	¾"	¾"	12¾"	P	8
M bottom	¾"	¾"	13¾"	P	2
N back	¾"	1½"	18½"	P	1
EDGE-JOINED PARTS					
O* bottom	¾"	13¾"	18½"	EJP	1
P* shelves	¾"	12¾"	18½"	EJP	3
Q* top	¾"	16¾"	24"	EJP	1
BACK					
R back	¼"	19½"	54¾"	FPLY	1
MOLDING AND OPTIONAL PANELS					
S sides	¾"	2"	16¼"	PCM	2
T front	¾"	2"	23"	PCM	1
U panels (opt.)	¼"	10"	10"	EJP	8

*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

Material Key: P–pine
EJP–edge-joined pine
FPLY–fir plywood
PCM–pine cove molding

Supplies: ⅜×2" dowel pins, #8×1¼" flat-head wood screws, ¾"×#18 brads, 1½"×#16 brads, stain, finish.

Next, make the door and side frames

1 Cut the door stiles (D) and rails (E, F, G) to size. Note in the Bill of Materials that you need to cut 9 F's. Set aside six of them for building the side frames later.

2 Using the method just described, make the dowel-hole alignment marks, drill the holes, and then glue, dowel, and clamp the door frame together. Check for square, and make sure the assembly clamps flat.

3 Cut the side-frame stiles (H) and rails (I, J) to size. Mark and taper-cut the bottom inside edge of each stile. Make the dowel-hole alignment marks, drill the holes, and then glue, dowel, and clamp each side frame. Again, check for square, and make sure that the assembly clamps flat.

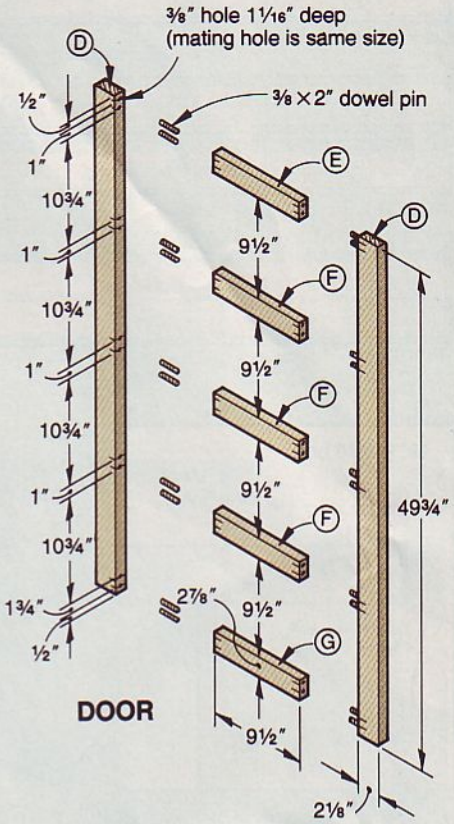
4 Cut or rout a ¼" rabbet ½" deep along the back inside edge of the side frames to accept the plywood back (R) later.

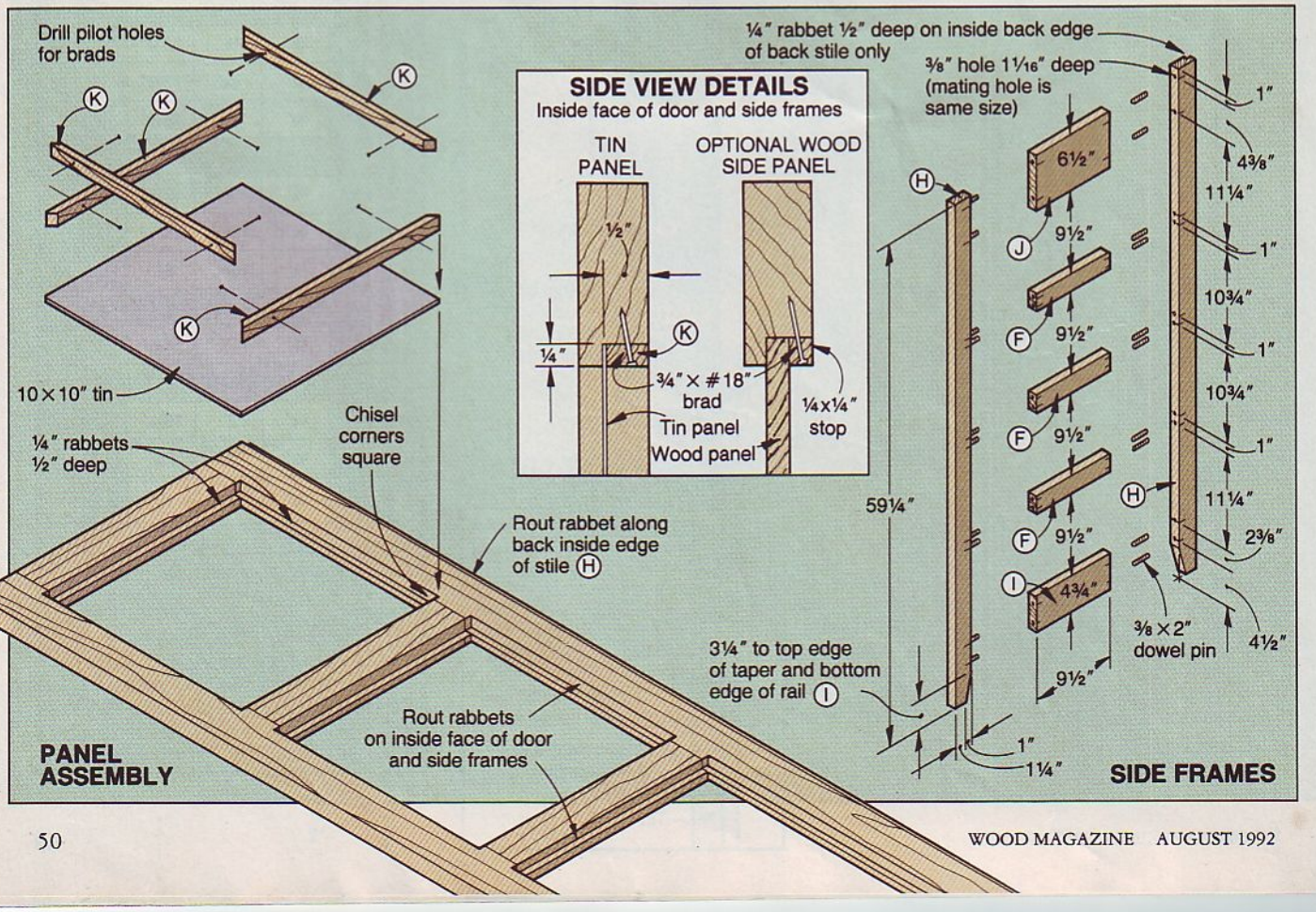
5 Fit your router with a ¼" rabbeting bit. Rout a ¼" rabbet ½" deep along the back inside edge of the door-frame openings to accept the punched-tin panels later. Repeat the process along the back inside edge of all panel openings in the side frames to accept the punched-tin or wood panels later.

6 Use a sharp chisel to square the round routed corners in the door- and side-frame openings.

7 Rip and then miter-cut the stops (K) for all the punched-tin panels. (We planed ¾"-thick pine to ½" thickness, and then ripped ¼"-wide strips from the edges for the ¼×½" stops.) If you plan to use the solid-wood panels, cut stops to ¼" square and to the same length as those used for the punched-tin panels.

8 Snip the head off a 1½×#16 brad, and chuck the headless brad into your portable drill. Sharpen the point, and use the brad as a bit to drill angled pilot holes through the stops (K) where shown on the Panel Assembly drawing and accompanying Side View detail *below*.





It's time to add the cabinet's top, bottom, and shelves

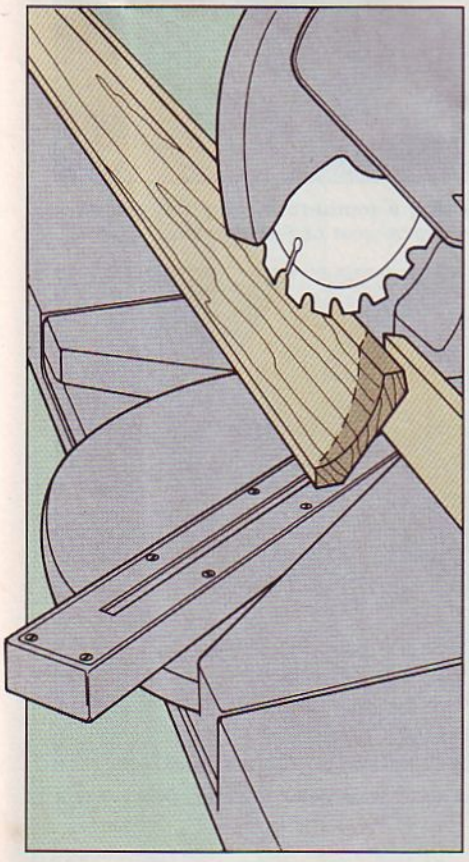
1 Cut the shelf cleats (L), bottom cleats (M), and upper back cleat (N) to size.

2 Drill mounting holes (in both directions), and screw (but don't glue) the cleats to the inside of the side frames where shown on the Exploded View drawing and accompanying Cleat detail.

3 Edge-join enough stock for the bottom (O), shelves (P), and top (Q). Cut the individual pieces oversized so each edge-joined panel measures an extra 1" in length and ½" in width. Glue and clamp each panel.

4 Later, remove the clamps, trim the bottom (O) to its finished size, and sand it smooth.

5 With the edges of the face frame flush with the outside surface of the sides, glue and nail the face frame to the side frames. (For an authentic look, we used old-fashioned steel-cut nails, commonly called square nails. See the Buying Guide for our source.



When you use these, be sure to align the rectangular head of each nail with the grain to lessen the chances of splitting the wood.)

6 Screw the bottom (O) in place to help hold the assembly square while the glue dries. Check for square. Nail the upper back cleat (N) in place.

7 Measure the openings, and cut the shelves (P) to finished size. Trim the top (Q) to size. You want the top to overlap the front face frame and side panels by 2". Sand the parts smooth.

8 Center the top (Q) from side to side on top of the assembly, and align its back edge flush with the back edge of the cabinet. Nail it in place (without glue), using the 1½" steel-cut nails. Then, working from the inside of the cabinet, drive screws through the two top cleats (L) into the bottom surface of the top panel (Q).

9 Measure the routed opening, and cut the back (R) to size from ¼" fir plywood.

And lastly, add the molding, and finish your pie safe

1 As shown in the drawing at *left*, miter-cut the side cove molding pieces (S) and front cove molding piece (T) to the length listed in the Bill of Materials. (We purchased 2" pine cove molding at a local homecenter for these pieces. Then, as shown in the drawing at *left*, we angled the mitersaw 45° from center, supported the flat areas of the molding against the mitersaw table and fence, and miter-cut the pieces to length.)

2 Using the Cove detail accompanying the Exploded View drawing for reference, nail the cove moldings (S, T) to the cabinet and to the top (Q).

3 Finish-sand the pie safe cabinet, door, stops, shelves, and wooden side-panel inserts if you're using them. Remove the sawdust (we used our shop vacuum and a tack cloth) from the cabinet and the other parts. Finish the pieces as desired. (We chose a distressed antique look. For more information on this process, see the article on the next page titled "How to Make Your Pie Safe Look Like an Antique."

4 If you've decided on wood panels for the side frames, edge-join enough ¼" pine stock (we planed thicker stock) for eight panels (U) for the side frames. (Because we wanted ¼" panels with two good faces, we shied away from using ¼" plywood.)

5 Punch the tin panels, using the technique and pattern shown in the previous article. Install the tin panels, and then nail the stops (K) in place.

6 Install the shelves (P) and screw them in place. Attach the hinges and fasten the latch to the door where shown on the Exploded View drawing. Nail the back (R) in place. Finally, bake a few pies, and head to the store for some ice cream while they cool slowly in your new pie safe.

Buying Guide

- **Old-look tin panels.** 4—10×10" blank panels (unpunched) for $17.39 ppd., 12 blanks for $45.40 ppd. Or, if you prefer to buy prepunched panels, order 4—10×10" RP-1041 panels, $55 ppd., or 12 panels for $157 ppd. Country Accents, P.O. Box 437, Montoursville, PA 17754. Prices are for continental U.S.; elsewhere, please call for quotes. Catalog $5. To order, call 717/478-4127.
- **Hardware.** Two pairs of ¾×2" antique finish no-mortise hinges, and one cast iron latch with catch. Kit, no. 71161, $9.50 ppd. Geneva Specialties, P.O. Box 636, Lake Geneva, WI 53147. Or, call 800/556-2548 to order.
- **Old-fashioned steel-cut nails.** 4d, fine finish nails, 1½" long. 1 pound box (approx. 322 nails), $10.95 ppd. Tremont Nail Co., P.O. Box 111, Wareham, MA, 02571. Or call 508/295-0038.

Produced by Marlen Kemmet
Project Design: James R. Downing
Photographs: Hopkins Associates
Illustrations: Kim Downing; Mike Henry
Photo Stylist: Nancy Briggs

HOW TO MAKE YOUR PIE SAFE LOOK LIKE AN ANTIQUE

To make a natural wood surface look old, as we did with the pie safe on *page 47*, follow the following steps:

1 Distress the piece by scratching and denting parts of the cabinet where the original piece would have received the greatest wear through the years. For the pie safe, this would have been near the feet, edges and top, and around the latch. We used a ball peen hammer to make dents, a screwdriver for scratches, and a rasp to scuff areas of heavy use. As shown in Photo A, round over the edges and corners with 80-grit sandpaper wrapped around a 1" dowel. For a natural "worn" look, remember to sand the edges unevenly from spot to spot.

2 Apply a dark stain to areas such as the base of the legs, around the latch, and other places along edges where dirt would likely accumulate over time as shown in Photo B. Add the same stain to scratches and nicks to accentuate these blemishes. For greater controllability when applying, we prefer gel stains.

3 Apply a lighter stain to the remaining areas, and blend the stains where they meet. Let both stains sit for a few minutes, then wipe away the excess.

4 Lighten heavily worn areas with paint thinner *before* the stain dries, as shown in Photo C. The thinner partially removes stain to simulate wear the pie safe would have incurred over time.

5 Add a bit more character by spattering the surface. To achieve this accent (called "fly specks" by some), first mix two parts gel stain with one part mineral spirits in a shallow container. Then, dab an old toothbrush, or a paintbrush with the bristles trimmed to ½" long, into the mix. Practice your spattering technique on a piece of paper before trying it on the pie safe. Place the brush about 6" away from the paper, and run your finger through the bristles as shown in Photo D. Don't overdo it. A little spattering goes a long way. Later, apply a clear finish.

Apply a gel stain to areas prone to dirt and grime buildup.

Using a toothbrush, give the project a uniform coat of fine speckles.

For an edge-rounding tool, wrap 80-grit sandpaper around a 1" dowel.

Before the stain dries, lighten any high-wear areas with paint thinner. Don't forget to wear the protective gloves.

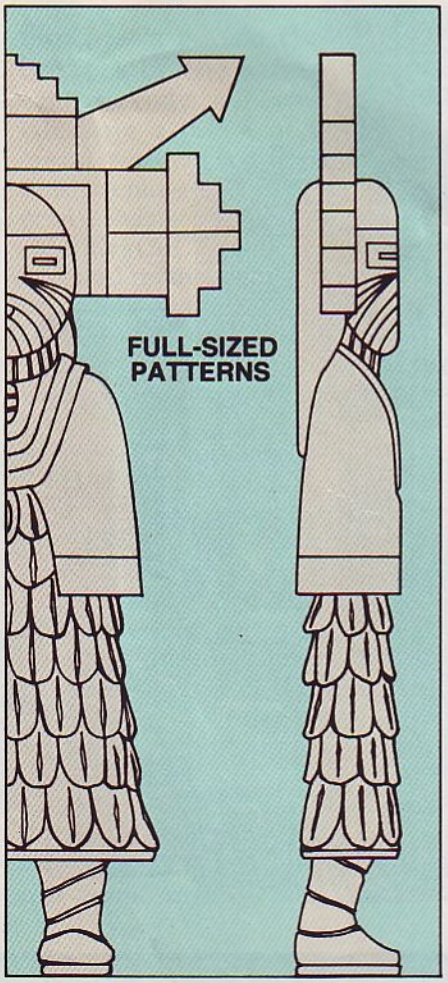
CARVE SHALAKO
A KACHINA-STYLE PENDANT

Designed by Kansas City carver Bobbie K. Thurman, this stylish wearable celebrates the beauty of Pueblo Indian art

Carver and teacher Bobbie K. Thurman proves his respect for the Native Americans of the Great Southwest every time he picks up a carving knife. That's because he specializes in kachina-style dolls. What are they? According to Bobbie, kachinas are the spiritual symbols used in ceremonies by the Hopi and other Pueblo peoples.

"There are probably 600 different kachina patterns," he explains. "They represent spirits involved in harvest, weather, hunting, birth, death—all aspects of life."

We liked Bobbie's colorful work so much that we asked him to provide a design for *WOOD*® magazine readers. Bobbie calls this pendant *Shalako*, a design based on the kachina that portrays a role in the rain ceremony.



Begin with basswood

For the pendant, you'll need a blank of basswood (or other fine-grained wood) measuring ½ × 2¾ × 5". Trace the pendant outline from the pattern. Then, mark a vertical centerline and reference lines for the front and back of the head, the bottom of the cape, and the skirt.

With a ½" No. 3 straight gouge, remove wood on the front and back of the headdress (leave the head full thickness for now) until it is about ⅛" thick. Next, slightly round the face mask and the back of the head.

Now, mark the necklace, collar, and front of the cape and carve them in. A ⅛" V-tool will work for detailing necklace lines.

After shaping the cape and folds with a ¼" No. 9 gouge, move to the legs and feet. Round the legs and boots. Use a ⅛" V-tool to define the soles and wrappings.

Feather the skirt

The shalako's skirt has seven rows of feathers, with each full row containing 12 feathers (front and back). The first row begins behind the necklace. Pencil in the first six rows evenly from top to bottom. Make the feathers in the seventh, or bottom row, a bit longer so that the other rows will appear to overlap.

Next, with a knife, make straight cuts into the wood (stop cuts) to define the feather rows. Then slice into the stop cut of each row at a slight angle to remove the chips that create the undercuts of the overlaping feathers. Now, define the feathers with a knife. Cut a center barb in each.

Paint on a colorful costume

After sanding your carving, smooth the surface by burnishing (rubbing) with the back of a gouge or a spoon. Then, seal the wood with satin-finish lacquer.

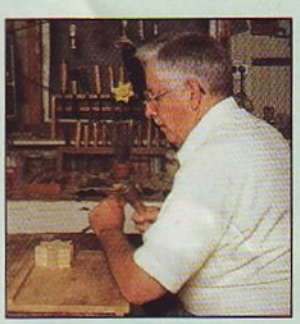
You'll need acrylic paints in red, turquoise, black, white, burnt umber, and gold. Leave the cape and boots unpainted; the wood simulates deerskin.

When the paint has dried, rub on paste wax and buff. Add a screw eye to the top of the headdress and fit it with a lace.

Design: Bobbie K. Thurman Photograph: Wm. Hopkins

GARDENING WITH A GOUGE

CAPTURE A DAFFODIL'S BEAUTY IN WOOD



John Hagensick digs into a daffodil carving. He's removing the top layer from the flower blank.

TOOLS AND SUPPLIES

Stock

Basswood 2×4×4″ for flower, ½×2×14″ for stem, four ¾×¾×10″ and one ¾×¾×8″ for leaves, 4×4×6″ for pot. For a kit of precut blanks and a turned pot, see the Buying Guide, *opposite page.*

Tools

Gouges
- 10mm or larger no. 7, no. 5
- 5mm no. 9

V-Tools
- 6mm no. 12, 4mm no. 12

Knife
- Bench knife

Power carver (optional)
- Rotary carver with burrs

Finishing

Aerosol clear lacquer

Liquitex acrylic paints
- •Gesso—primer
- •Cadmium yellow medium
- •Chromium oxide green
- •Burnt umber
- •Brilliant orange

If you're starting with a kit, skip to "Rough out the flower" *below.* Otherwise, locate the center on top of a 2×4×4" block. Trace the full-sized flower pattern, *right,* onto it, centering the pattern over the block center.

Adjust the pilot bit of a 2" holesaw (inside diameter approximately 1¾") so it projects ¼" or less beyond the cutting edge. With the holesaw chucked into your drill press, pilot on the center mark to bore 1" deep, forming a cylinder which will become the flower's trumpet. Change to a ½" bit, and drill 1" deep, following the pilot hole. (We held the block with a handscrew clamp.)

Mark the center on the bottom of the piece, and bore ½" deep with a 1" holesaw (inside diameter about ¾"). Again, set the pilot bit for minimum protrusion. Then, cut around the pattern outline with a bandsaw or scrollsaw.

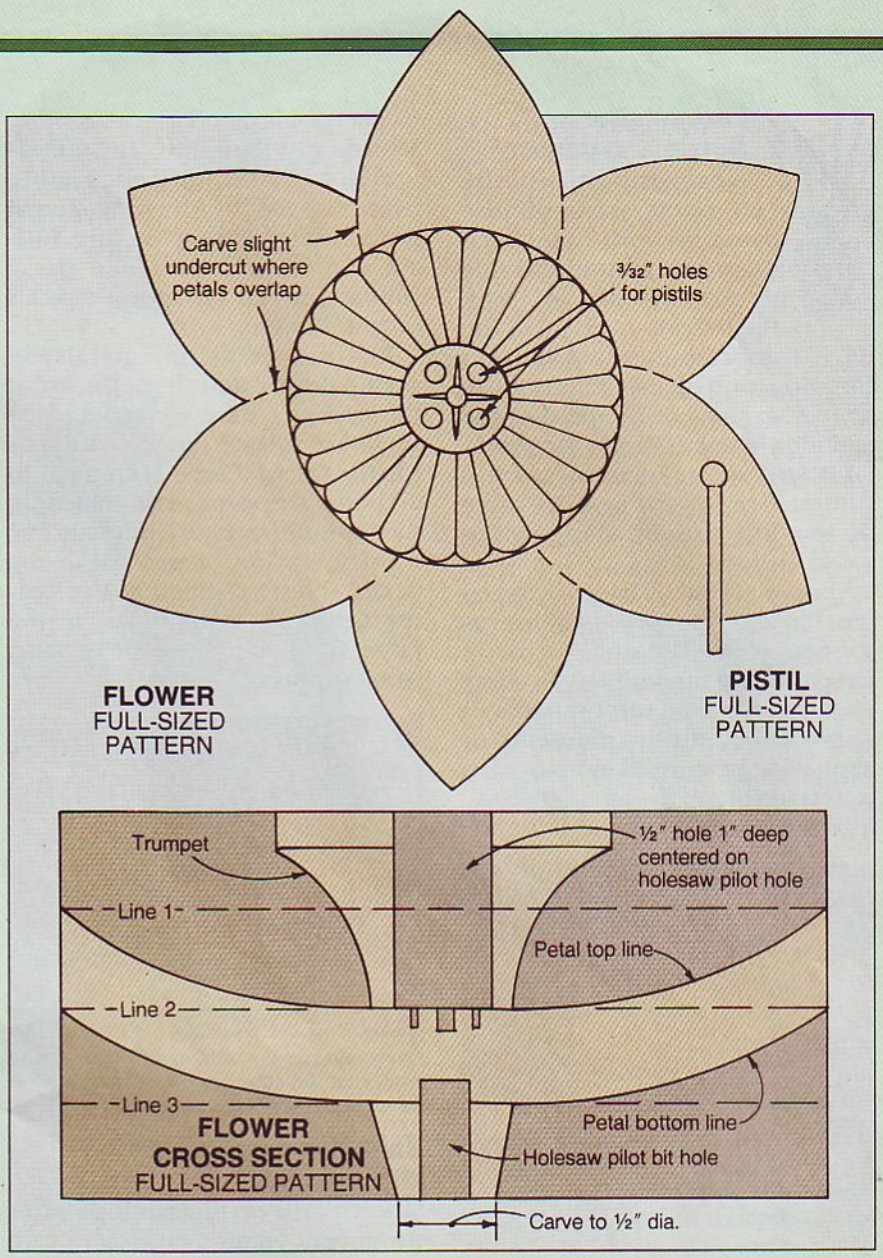
Rough out the flower

Divide the flower blank into four equal horizontal segments by drawing three parallel lines ½" apart around the sides. Place the first line ½" from the top, as shown on the Flower Cross Section drawing at the *right.*

Next, brace the blank against a bench stop, and remove the top ½" section of the petals with a 10mm or larger no. 5 or no. 7 gouge. (You could make quick work of this by using a ¾" carpenter's chisel, too.) Do not cut away any of the central cylinder—leave it full height. Grain direction changes from petal to petal, so be careful to avoid chip-out.

Draw the curved petal top line between the point of each petal on the upper line and the base at the next lower line, as shown on the Flower Cross Section drawing. Accurate curves aren't critical here; you can draw the lines freehand. Carve down to them with your gouge as shown *right.*

Continued



As you carve down to the petal top line, take care to avoid chip-out near the petal tips and bases.

Buying Guide

Complete kit. Precut parts, turned flowerpot, *Carving Realistic Flowers* book by John Hagensick; $34 ppd. in U.S.
Parts only. $20 ppd. in U.S.
Book only. $17.50 ppd. in U.S.
(Illinois residents: please add 7% sales tax to prices shown.)
All available from: L/C Publishing Co., 531 Thatcher Rd., River Forest, IL 60305.
No telephone orders, please.

Fashion the flower's trumpet

Next, rough out the trumpet. Mark off the flared lip with two pencil lines, one around the side of the cylinder ¼" from the top and a circle on the top 3/16" in from the side. Stop-cut the line you drew around the side. Also stop-cut the base of the cylinder where it meets the petals. (A *stop cut*, an incision along a pattern line, allows you to carve up to a line without chipping out wood beyond it.)

Form a funnel shape between the lip and the petal surface, as shown *below*. The no. 7 or no. 9 gouge and your knife will come in handy as you carve a smooth curve to a bottom diameter of about 1". Be careful not to snap the trumpet off—the ½" hole leaves a thin wall at the bottom.

Form the trumpet shape by carving down from beneath the trumpet lip to petal surface.

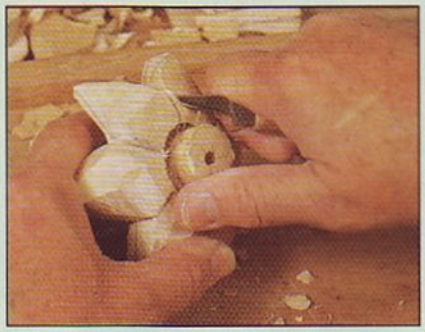
Rough out the inside of the trumpet with your knife and gouges, matching the inside contour to the outside shape. (You could shape the trumpet with a flexible shaft machine or hand-held rotary tool and cutting burrs, too.)

Create natural-looking petals

Draw the petal bottom lines parallel to the top lines and ½" below them. Cut away the bottom ½" section of the petals, and then carve to the petal bottom lines. Taper the calyx (the cylinder on the bottom of the flower) to about ½" diameter at the end.

The petals overlap each other alternately. Indicate the petals which will be entirely visible from the top by drawing pencil guidelines (shown on the full-sized pattern), and then draw similar lines on the *opposite* petals on the bottom.

Begin carving the petals by shaping their bottoms. Undercut the edges of the overlapping petals to accentuate the separation as shown *below*. Carve each petal to a spoon shape on top, matching the bottom curve. Undercut the overlapping top edges. Make the petals about ⅛" thick at the center, tapering to about 1/16" at the edge for a delicate look. Sand smooth on both sides.



Carve alternate petals to full shape, and undercut the edges to create the illusion of separate, overlapping petals.

Take time to refine the trumpet

Since it will be the carving's most prominent feature, take extra care in detailing the trumpet. Reduce the wall thickness to about ⅛" as you refine the shape and smooth the surface. Draw pencil lines vertically on the inside and outside of the trumpet, dividing it into four sections. Subdivide each of those roughly into thirds. Don't try to make all 12 sections exactly equal—that wouldn't look natural.

With a small V-tool, carve along the guidelines inside and outside to give the impression of creases. Bring the carving line over the edge of the trumpet rim, and then widen the notch with your knife to create a scalloped effect. Carve V-tool grooves about 5/8" long on the top of the lip between the lines to heighten the scalloped look. Sand the trumpet, softening any sharp edges. A conical rotary burr works well to detail the trumpet, too, as shown *below*.

A hand-held rotary tool with a conical carbide or ruby burr does a great job on trumpet details. You could carve the entire flower with power tools.

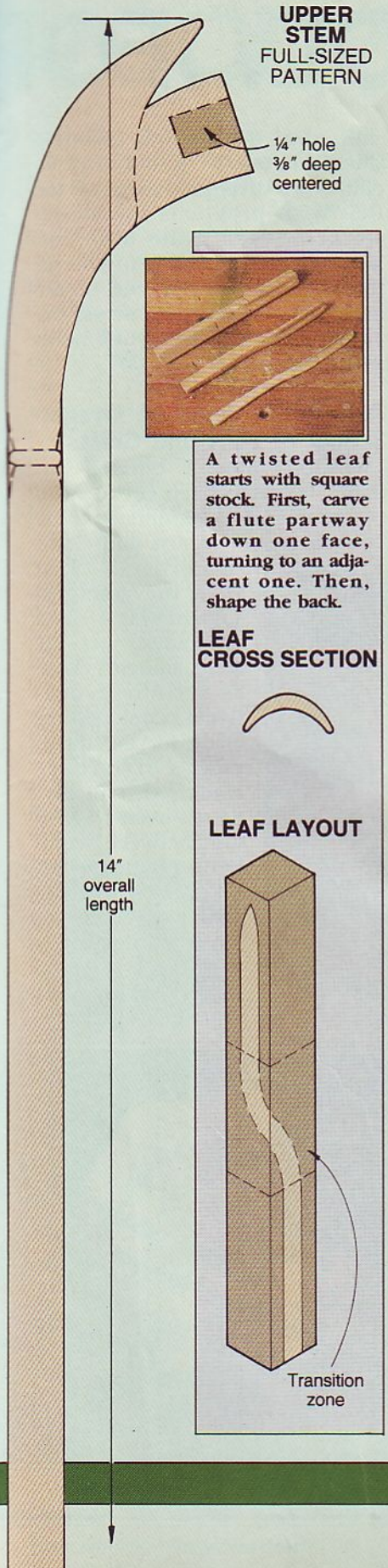
Carve five pistils about 3/32" diameter with a ball on one end from 3/16" square stock 1¼" long. Drill 3/32" holes where shown on the pattern, and then glue the pistils into the holes with the tops about 1/16" below the trumpet rim.

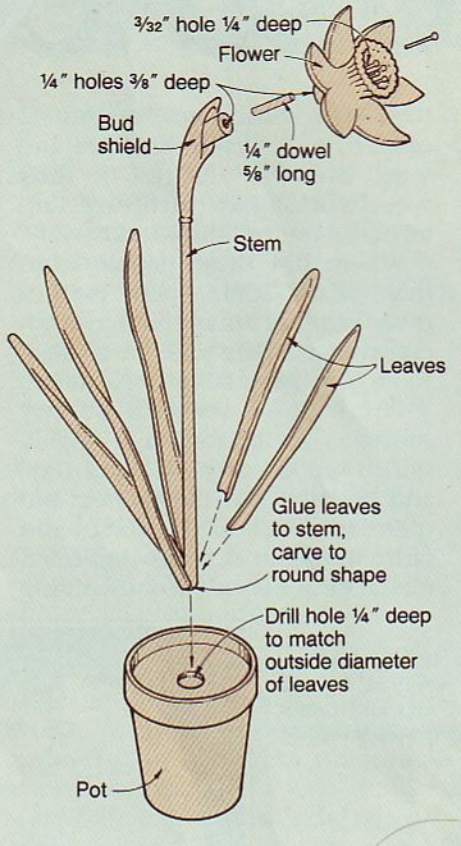
Now, make the stem

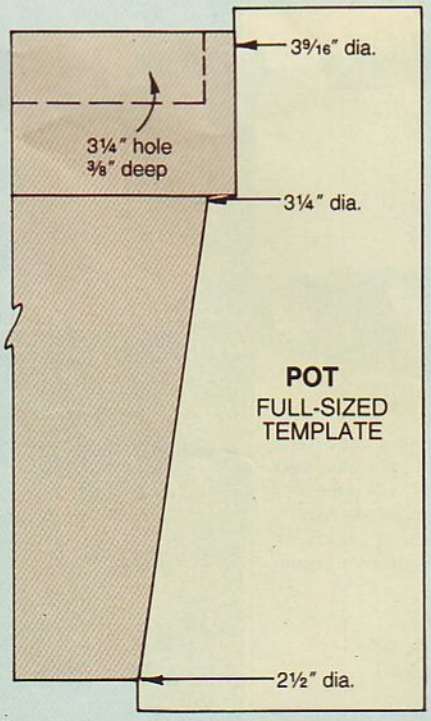
Trace the full-sized pattern for the upper stem onto a ½ × 2 × 14" piece of basswood. Extend the lower part, making the stem 14" long overall. Bandsaw the stem blank, and then drill a hole the size of the one in the flower where shown.

Carve the top to ½" diameter as far back as the dotted line on the pattern. Then, study the flower photo on *page 63*, noticing how the green stem emerges from the brown bud shield.

Round the edge just below the upper stem, and then carve the long, oval bud-shield opening. The top of the shield forms a rounded point. Hollow it out about 3/16" deep above the stem. Form a slight bead where shown. Carve the stem below it to about ¼" diameter.







Project Design: John Hagensick,
Photographs: Frank Cozza, Photographic Impressions; John Hetherington
Illustrations: Kim Downing; Bill Zaun

A lesson in leaves

Carve the leaves from five pieces of ¾ × ¾" basswood, four 10" long and one 8" long. On each, mark off a 3" section approximately in the middle for the transition area where you will carve around a corner to create a cupped, twisted leaf.

Draw two parallel lines about ½" apart along one side of the stock from the bottom to the transition zone. There, curve the lines to the edge and continue them on the adjacent face—either left or right. Bring them to a gentle point at the top, shown in the Leaf Layout drawing, *left*.

Gouge out a groove about 3/16" deep between the lines. Then, rough out the back of the leaf with your knife. Make the finished leaf about 3/16" thick at the center, with thin edges.

Paint it, and pot it

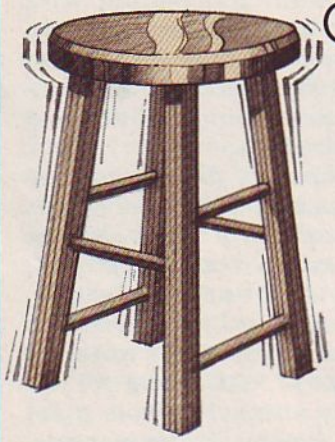
Attach the flower to the stem with a ¼" dowel (or one to fit the pilot hole). Fair the stem and calyx. Sand, and then paint all parts except the bud shield on the stem with gesso, a white primer. Sand the gesso coat smooth. Mask off the stem and flower, and then coat the bud shield with clear spray lacquer. Paint the flower with yellow acrylic paint. (See the supplies list for the colors we used.) Bring the green of the leaves and stem up onto the calyx, almost to the petals.

File, sand, or carve the bottoms of the four long leaves to fit together around the stem. Glue them to the stem, clamping with a heavy rubber band. Place a small spacer block between each leaf and the stem until the glue dries. Insert the short leaf between the stem and any other leaf.

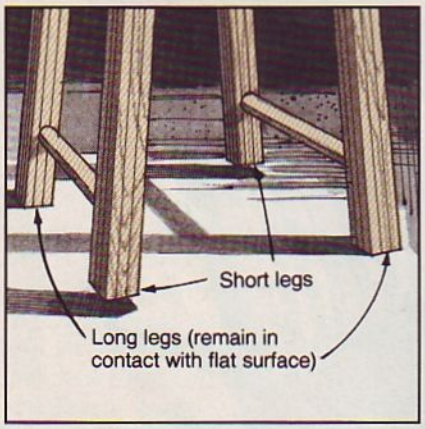
Carve the bottom to a drill-bit diameter. Turn a flowerpot using the template *left*, and drill a hole for the stem. Paint the soil burnt umber and the pot orange mixed with burnt umber.

THE LONG AND SHORT OF IT

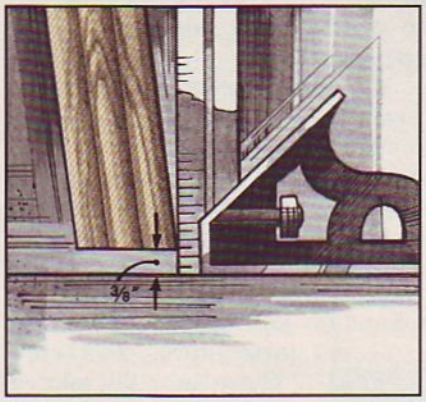
Getting the wobble out of a four-legged project



Few of us can assemble a four-legged chair, table, stool, quilt rack, or other piece of furniture without there being a little wobble when you set the piece on a flat surface. This happens because one or more legs are longer than the others. Here's a simple solution that takes just a few minutes of your time.

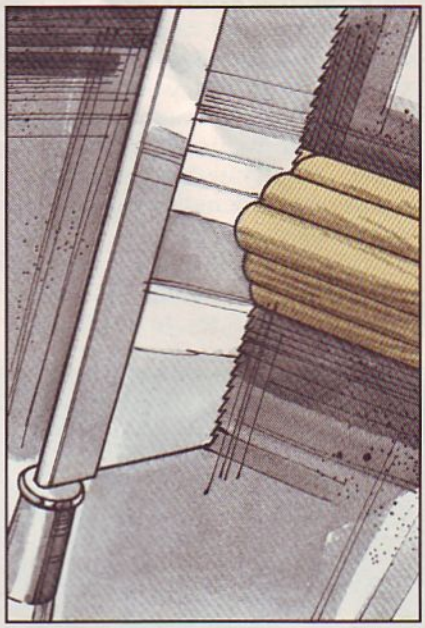


1 First, you need to determine which legs are long. To do this, place the project on the flattest surface available (such as the top of your tablesaw or workbench). Tip the piece back and forth, and mark Xs on the two long legs that remain in contact with the flat surface.



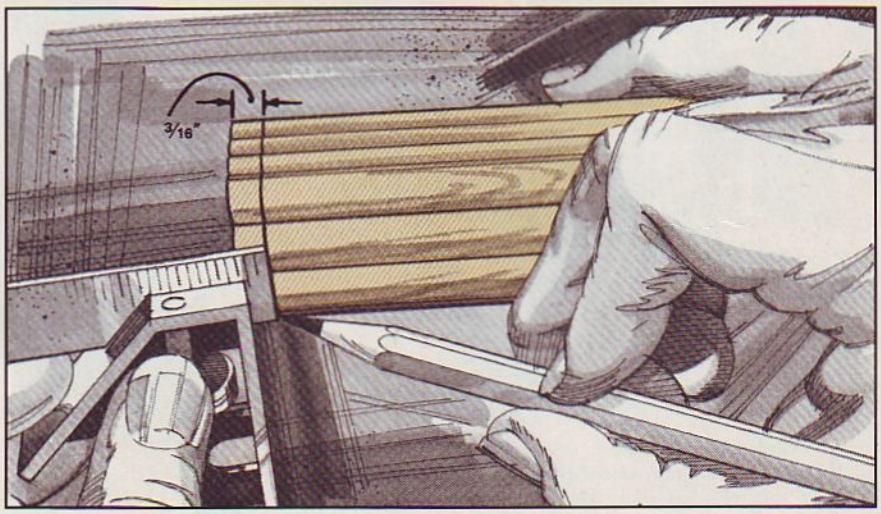
2 Tip the project so that three legs touch the flat surface, and with a combination square measure the gap between the work surface and the fourth leg. (In the example shown *above*, the gap measures 3/8".) Divide your measurement by two (3/16" in this instance). You will need to remove this much stock from the ends of both long legs.

3 Adjust your combination square (to 3/16" in our example) and then mark around the long legs as shown *below* to establish your cut-off lines for the needed stock removal.



4 With a crosscutting handsaw (we used a dovetail saw), carefully cut along the marked lines. (If you don't follow the lines, you may wind up repeating the whole process.) To remove 1/8" or less of stock, use a portable belt sander. Be careful not to remove too much stock.

Written by Bill Krier
Illustrations: Jim Stevenson



MASTERPIECE
MUSIC BOX
ONE SWEET-SOUNDING TURNING

This lathe-turned music box will strike a responsive chord with anybody who appreciates beautiful wooden objects—we guarantee it! And even with the rich-looking veneer inlays that accent its traditional lines, you'll waltz right through this project, completing it in just a few enjoyable hours.

Continued

MASTERPIECE MUSIC BOX

TOOLS AND SUPPLIES

Stock

Walnut bowl-turning blank, 2×4½×4½"
Walnut stock, ¼×4×12"

Lathe tools

3–4" faceplate with a 4½"-diameter auxiliary faceplate of scrapwood
⅜" gouge, ⅛" parting tool

Lathe speeds

Roughing: 600–900 rpm
Finishing and sanding: 1,200–1,500 rpm

Buying guide

Inlays, movement. Inlay strip for side, round inlay for top, and Swiss musical movement (Brahms' "Lullaby"), item no. WD892, $29.95 ppd. in U.S. Constantine's, 2050 Eastchester Road, Bronx, NY 10461. Or, call 800/223-8087.

Trace or draw the full-sized bottom pattern *below* onto a ¼×4×12" piece of walnut. Back the workpiece with scrapwood, and bore a 3⁄16"-deep counterbore where shown with a 1⅛" Forstner bit or spade bit chucked into a drill press. Change to a ⅜" brad-point bit, and drill through the center of the counterbore.

With a ¼" brad-point bit in the drill press, drill the center hole and six ⅛"-deep counterbores where shown. Then, drill ⅛" holes through the six counterbores.

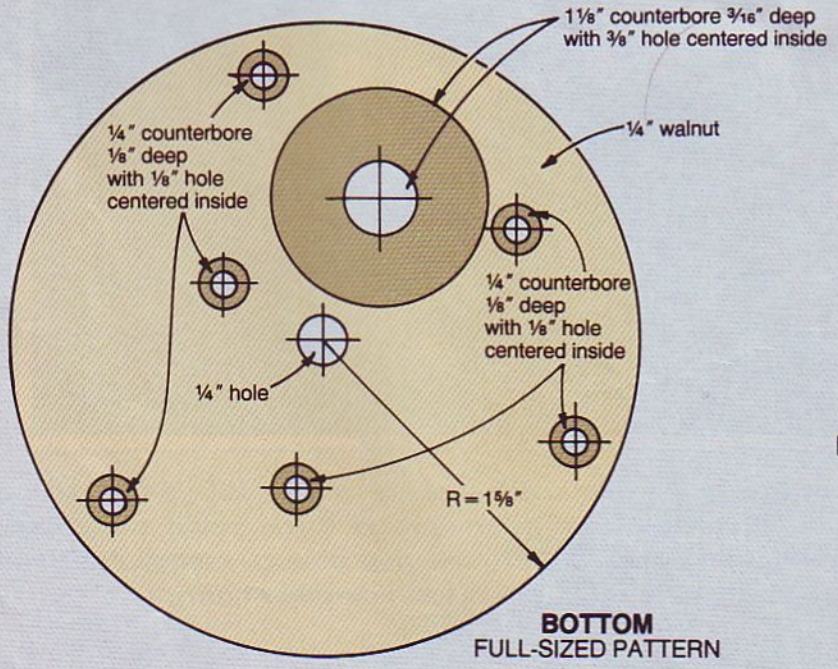
Cut out the bottom with a bandsaw or scrollsaw. Sand, and apply a clear oil finish to both sides. Mount the musical movement on the flat side with the winding stem protruding through the ⅜" hole, and then set the bottom aside.

Start turning on the inside

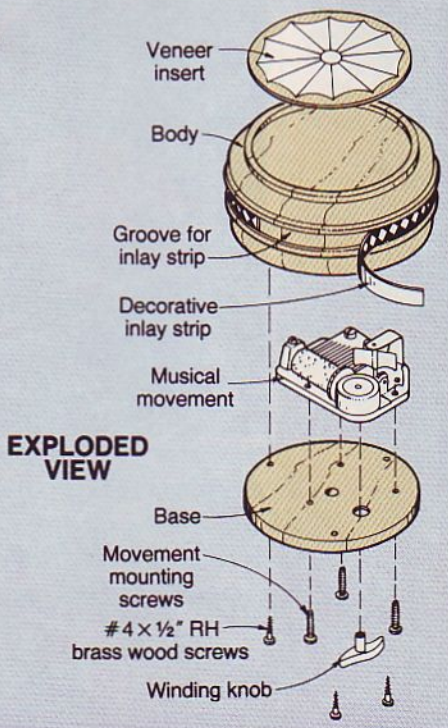
Glue a piece of scrapwood 1½×4½×4½" to the face of the turning blank that will be the top of your music box. This will become your auxiliary faceplate. Clamp until dry, and then draw diagonal lines on the scrapwood faceplate.

Using the junction of the lines as a center, scribe one circle 4½" in diameter and another one the same diameter as your 3–4" lathe faceplate. Bandsaw around the outside line. Then, place your lathe faceplate inside the smaller circle, and screw it to the auxiliary faceplate.

True the side of the blank with your gouge. Then, place the tool rest parallel to the face, true


1⅛" counterbore 3⁄16" deep with ⅜" hole centered inside
¼" walnut
¼" counterbore ⅛" deep with ⅛" hole centered inside
¼" counterbore ⅛" deep with ⅛" hole centered inside
¼" hole
R=1⅝"

BOTTOM
FULL-SIZED PATTERN



EXPLODED VIEW

the face, and locate the center on it. To do this, move a pencil point across the rotating workpiece until it marks a point, not a circle.

From the centerpoint, mark two circles, one 2⅜" in diameter (1³⁄₁₆" radius) and one 3¼" (1⅝" radius). With your ⅜" gouge, turn a 1½"-deep hole inside the smaller circle (see Turning the Opening drawing, *below*). You don't need to sand this recess. Since the music-box movement fits into it, it won't be visible.

Inside the larger circle, cut a recess ⅝" deep with your gouge. Test-fit the bottom with the music box mounted on it, adjusting the size of the two openings, if necessary. The wall of the larger hole will show after assembly, so sand it with 100-, 150-, 220-, 320-, and 400-grit sandpaper.

Next, transfer the full-sized template to a piece of stiff cardboard, and turn the side profile. With your parting tool, cut the ⅜"-wide groove for the inlay ⅛" deep. Check the width against the inlay as you work.

Form a tenon to turn the top

Part off the body at the glue joint. Then, form a tenon on the auxiliary faceplate to fit the large recess in the turning (see Turning the Top drawing, *below*). With the body mounted snugly on the tenon, turn the face down to achieve an overall body height of 1¾".

Locate the center on the top face, and then mark a 3"-diameter circle on it for the inlay relief. (Measure your round veneer insert to make sure of the size.) Cut the relief 5⁄32" deep. The wood in the middle will be less than ⅛" thick as you reach that depth, so make your cuts carefully. Sand the body, except for the inlay areas, with progressively finer sandpaper from 100- to 400-grit.

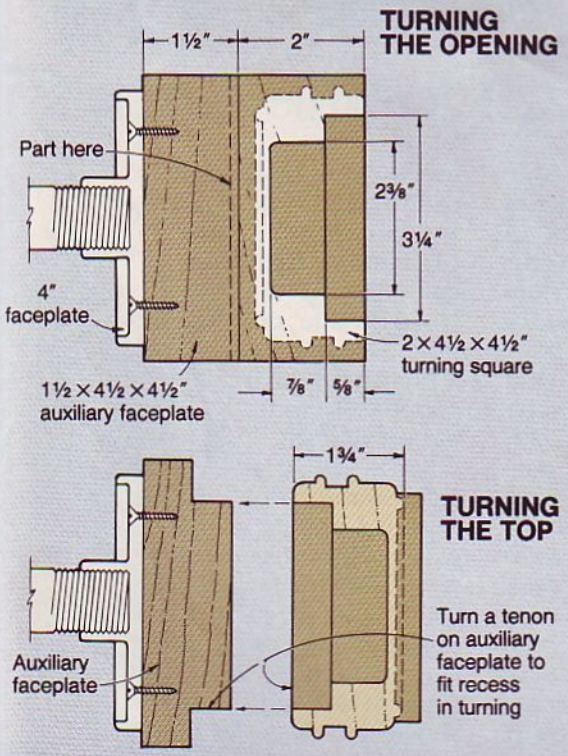
Dress it up with veneers

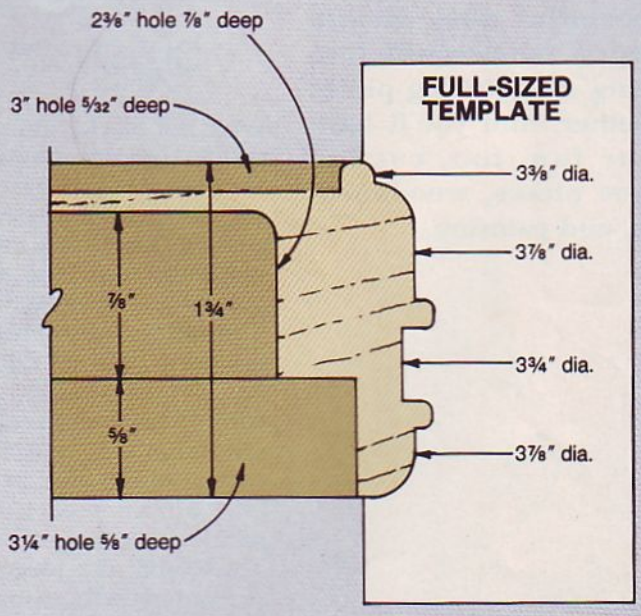
Apply a thin layer of glue to the back of the inlay strip. Then, starting from one end, press it into the groove. Cut off the overlapping end with an X-acto knife. Secure the inlay with a heavy rubber band, and then wipe away excess glue.

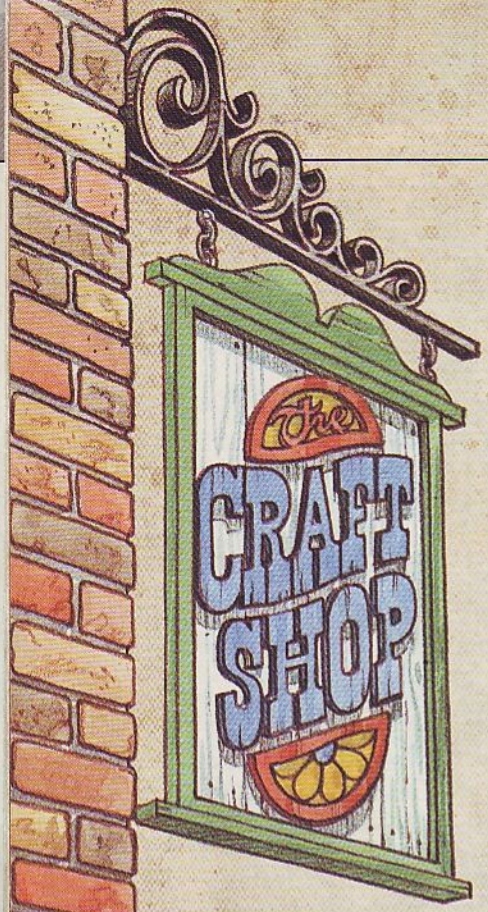
Carefully remove the circular inlay from the carrier by cutting the paper tape with an X-acto knife. Apply glue to the wood side of the inlay, position it, and clamp by pressing a scrapwood circle against it with your lathe's tailstock.

When the glue is dry, remove the body from the lathe. Carefully remove the paper tape by moistening a small area with a damp rag and scraping the tape away. Do not wet the inlay excessively. Hand-sand the veneer inlays, and then apply a clear oil finish to the music box, inside and outside. Using the bottom piece as a template, drill 1⁄16" pilot holes into the music-box body. Finally, attach the bottom with three #4 × ½" roundhead brass wood screws.

Project Design: C. L. Gatzke
Photograph: John Hetherington
Illustrations: Kim Downing; Mike Henry







KING OF THE CATERPILLARS

When it comes to entertainment, this king-size caterpillar does double duty. A toddler will love fitting the four big pieces together. And you'll have your fun, too, cutting those pieces, woodburning, and painting.

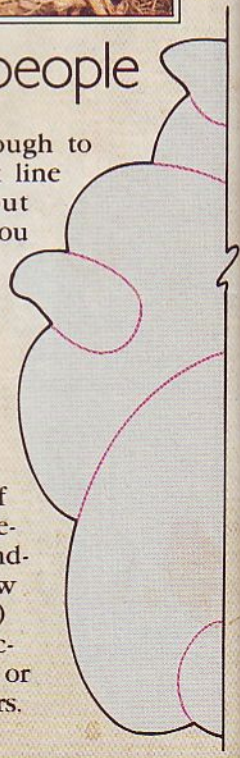
A big-piece puzzle for little people

Trace the black cutting lines from the full-sized pattern onto a 1½×9¼×10" piece of stock (a 10" length of clear, straight-grained 2×10 fills the bill). Softwoods such as pine, fir, cedar, or redwood (our choice) work well.

Install a sturdy blade in your scrollsaw (a good choice: Olson's no. 411 or similar, .110×.022" with 15 teeth per inch), and then saw around the outside line. Next, cut the inside lines to separate the four puzzle pieces. Sand slight round-overs along all of the edges.

Assemble the pieces, and trace the red woodburning lines onto your cutout. Burn the lines about 1/16" wide. Move the woodburning pen along the line at a steady speed—slowly enough to etch a solid, black line into the wood, but fast enough that you don't scorch the wood beside the line. Lift the pen from the wood periodically to let the tip reheat.

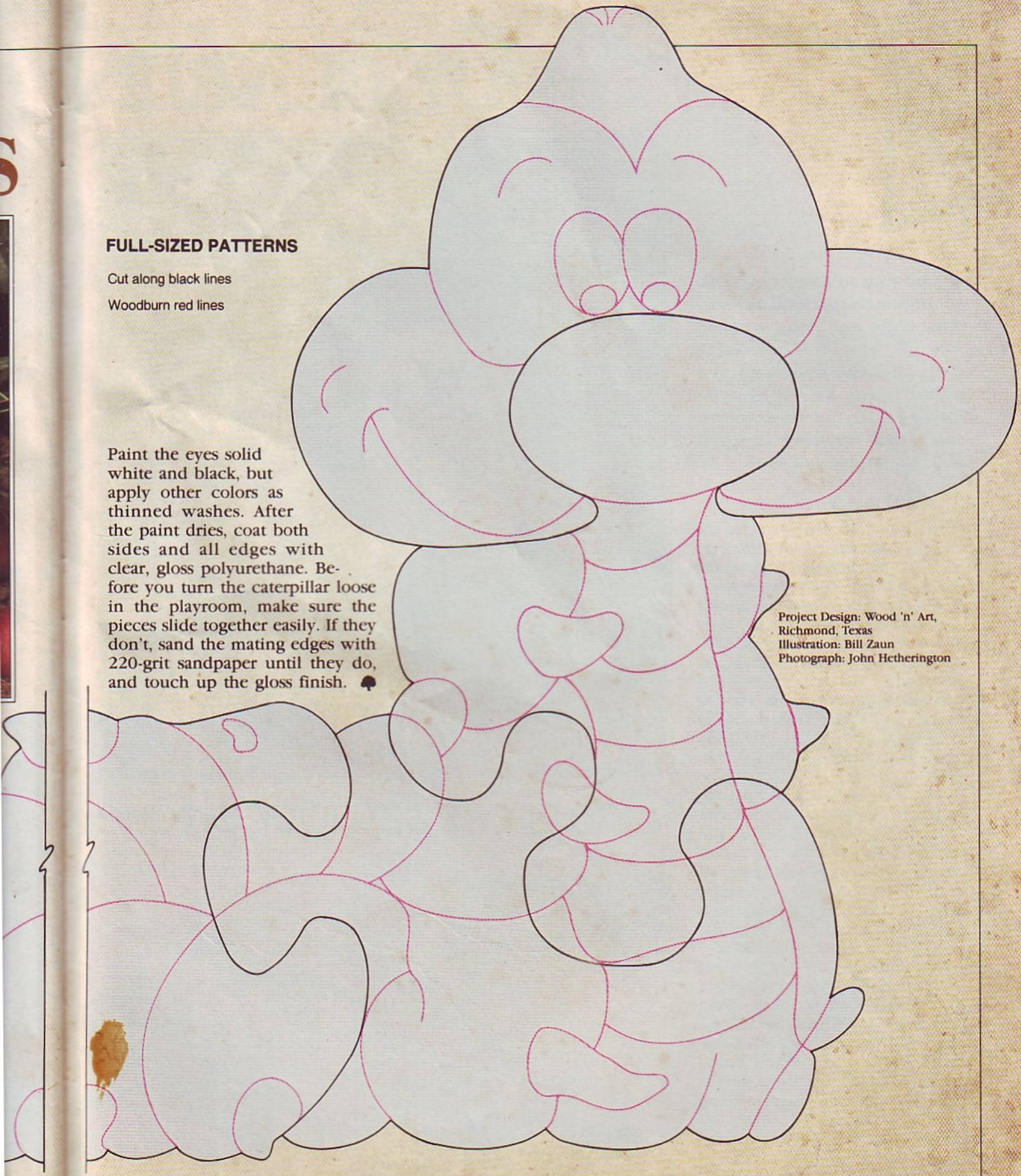
Sand all surfaces smooth, removing traces of pattern lines that remain. (We also sanded away a few scorch marks.) Now, add some accents with stains or acrylic artist's colors.



FULL-SIZED PATTERNS

Cut along black lines

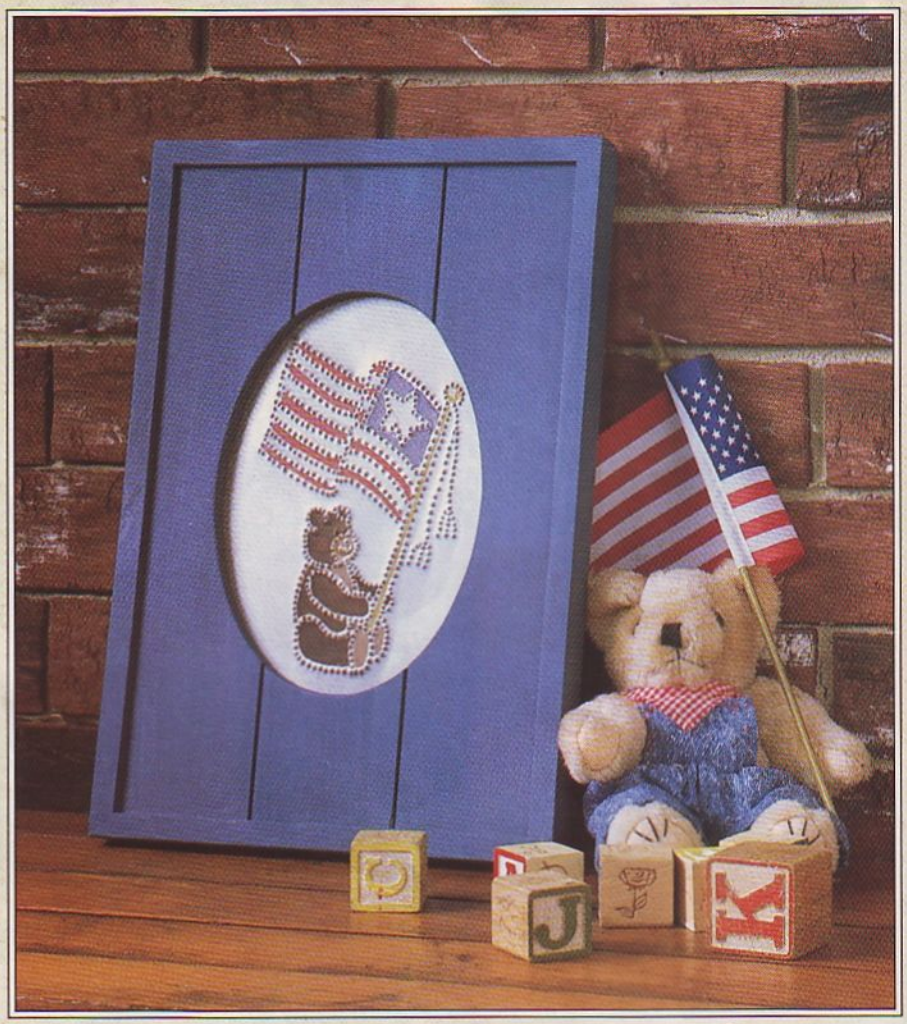
Woodburn red lines



Paint the eyes solid white and black, but apply other colors as thinned washes. After the paint dries, coat both sides and all edges with clear, gloss polyurethane. Before you turn the caterpillar loose in the playroom, make sure the pieces slide together easily. If they don't, sand the mating edges with 220-grit sandpaper until they do, and touch up the gloss finish.

Project Design: Wood 'n' Art, Richmond, Texas
Illustration: Bill Zaun
Photograph: John Hetherington

TEDDY BEAR IN T



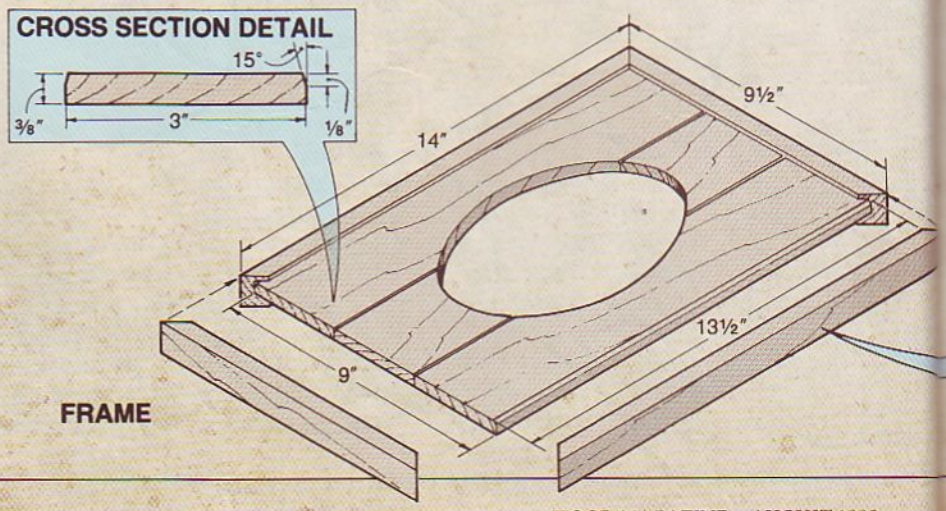
One great patriotic plaque

If you want to take a quick jab at tin-punching, look no further than our flag-waving friend here. When you're done with the punching, add some paint and a simple frame for a colorful country-style wall hanging in good old red, white, and blue.

Photocopy *the bear pattern on the* opposite page. *Now, turn to* page 42 *for instructions on the tin-punching technique, and punch the pattern into the middle of the back side of an 8×10" piece of tin. When you have completed your tin piece, come on back and we'll show you how to paint it and make a frame for it. For the frame, you'll need three pieces of softwood ⅜×3×16" and four pieces measuring ½×1×16".*

Paint the *raised* side of the punched tin with artist's oil colors. (The pattern indicates the colors we used.) Color the flat areas enclosed by the dots as shown in the photo. After the paint dries, apply Krylon Dulling Spray or a matte-finish coating to give the teddy-bear design an aged look.

Begin making the frame panel by planing, sanding, or sawing a 15° bevel about ⅛" deep along the front edges of three ⅜×3×16" boards. (See the Cross Section detail of the Frame drawing.) Edge-glue the three pieces together with the bevels facing up. When the glue has dried, cut the panel to 13½" long.



FRAME

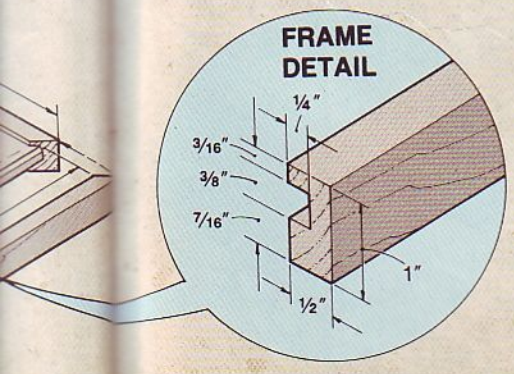
N TIN

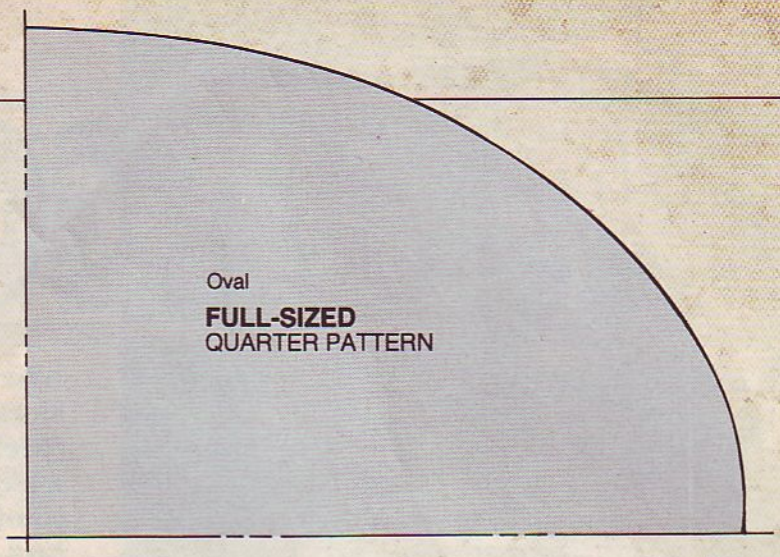
Draw an oval pattern, using the Full-Sized Oval Quarter Pattern. Center and trace the oval onto the panel with the long axis running lengthwise. Drill a blade start hole inside the oval guideline, and cut the opening with your scrollsaw.

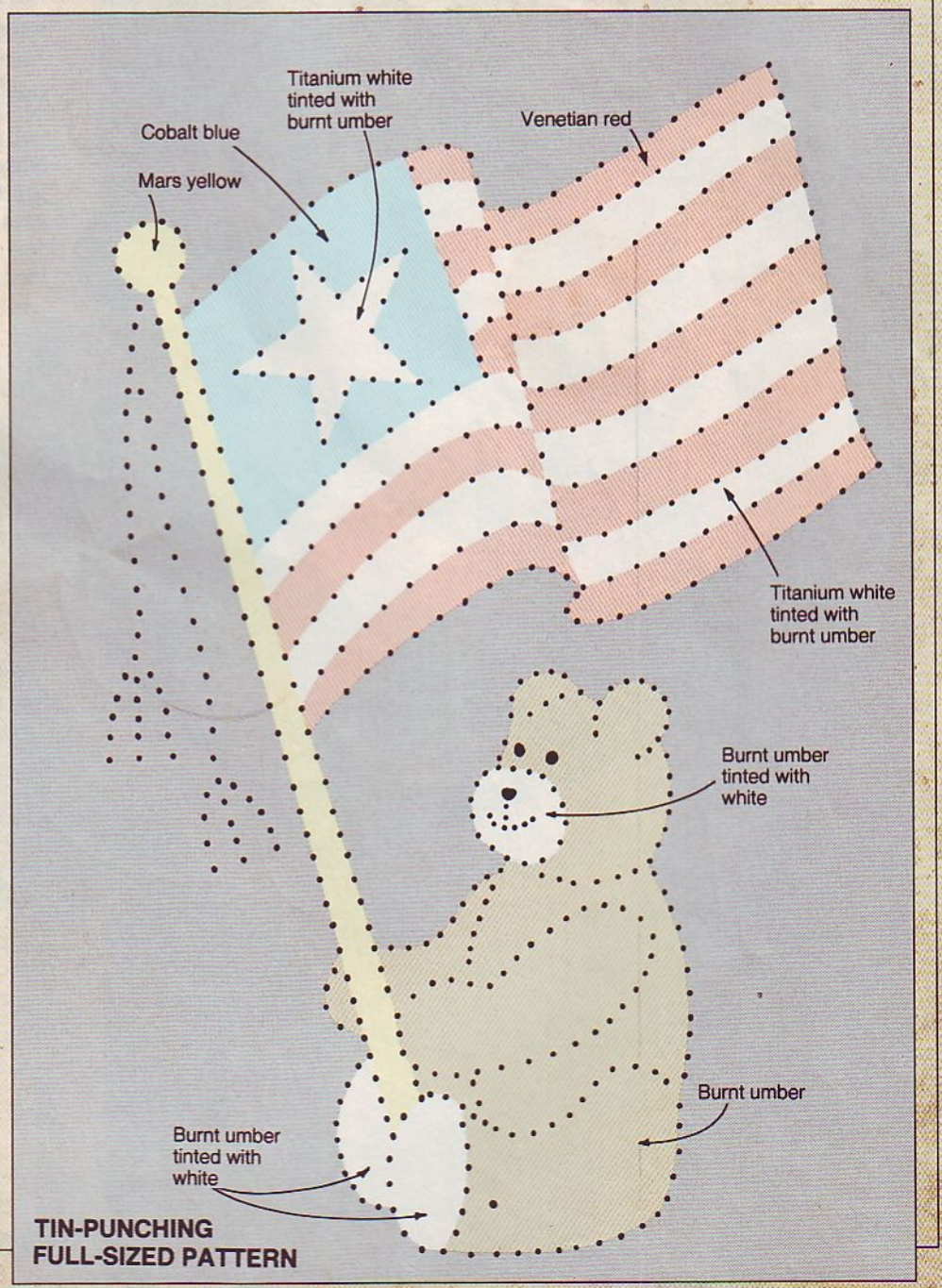
In each of four pieces of ½×1×16″ stock, cut a ⅜″-wide groove ¼″ deep where shown on the Frame detail. Miter-cut the pieces to fit around the panel, shallow rim to the front.

Sand the frame, and then paint it. (We painted ours with Wedgewood blue from the DecoArt Americana line of acrylic artist's colors.) With the painted side of the tin piece up, punch six ⅛″ holes in an oval around the bear picture, making sure they don't fall inside the frame opening. Mount the punched tin on the back side of the frame with #6×⅜″ roundhead wood screws. (The bumps raised by punching the screw holes prevent the screws from poking through the panel.) Install small screw eyes and hanging wire.

Project Design: Harlequin Crafts
Illustrations: Mike Henry; Bill Zaun
Photograph: John Hetherington



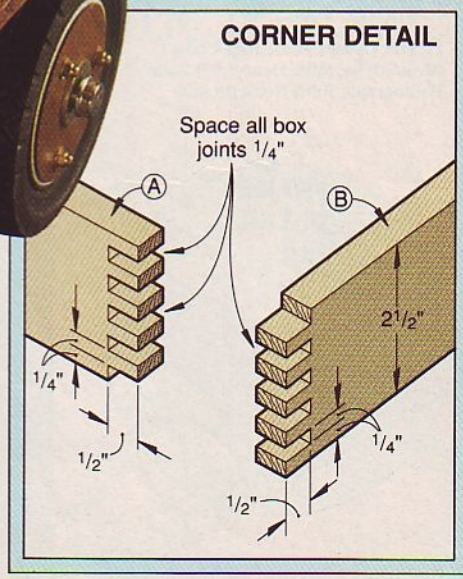




WAGONS,

Whether hauling building blocks or giving teddy bear a ride, this handsome four-wheeler will help your youngster get the job done. And you'll appreciate the wagon for its box-jointed corners, walnut trim, and sturdy hardwood construction.

Note: *You'll need some thin stock for this project. You can either re-saw or plane thicker stock to size. See the Buying Guide on* page 80 *for our wagon-hardware kit.*



HO! FOR THE YOUNGSTER WHO'S ALWAYS ON THE GO

Start with the wagon-box sides

1 From ½"-thick maple, cut the box sides (A), and front and back (B) to the sizes listed in the Bill of Materials.

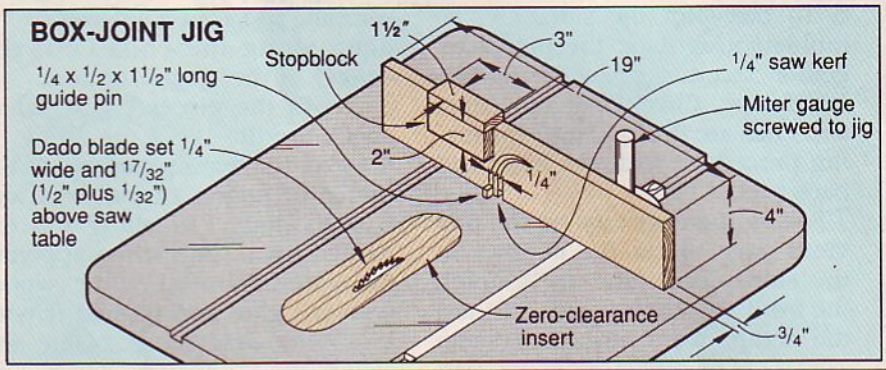
2 To box-joint the wagon-box pieces (A, B), start by fitting your tablesaw with a zero-clearance insert where shown in the Box-Joint Jig drawing at *right*. (Our Delta tablesaw requires a ½"-thick insert; we used plywood.)

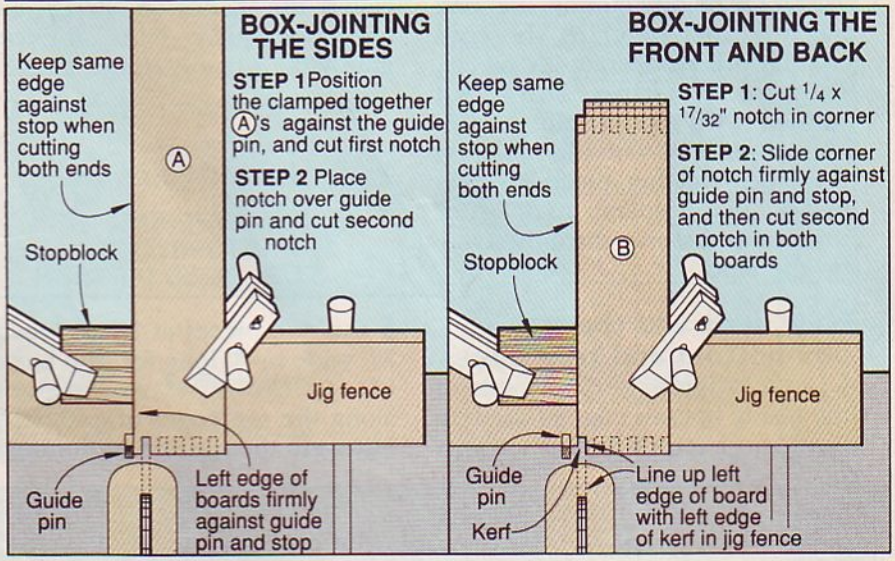
3 Mount a ¼" dado blade to your tablesaw (we used a stackable blade). With the blade running, raise the rotating blade through the insert and ½" above the surface of the saw table. Elevate the blade about 1/32" more (we found it is best to cut the fingers a bit long and sand them flush with the box sides after assembly).

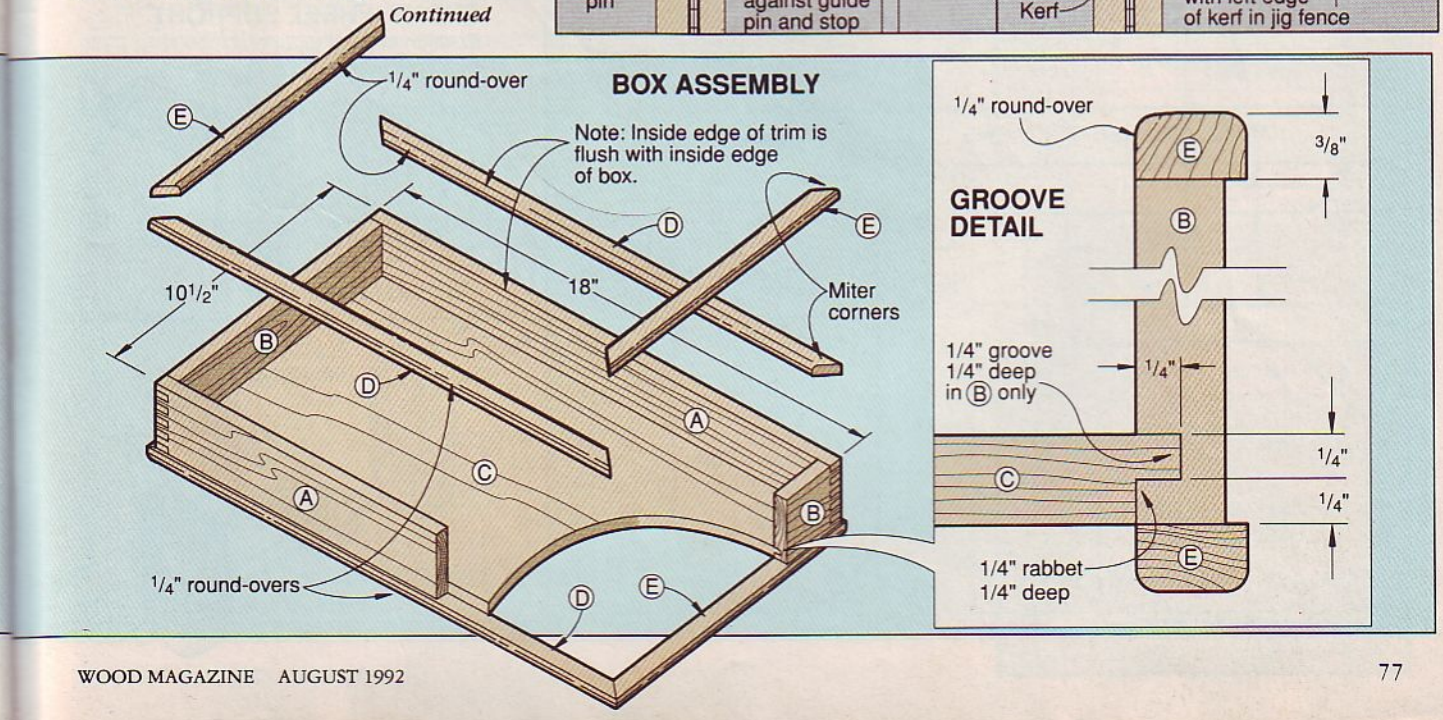
4 Construct the jig and stopblock shown on the Box-Joint Jig drawing. The stopblock helps steady the long wagon sides, front, and back when cutting the box joints.

5 Carefully locate and cut a pair of ¼"-wide kerfs ¼" apart in the

Continued




BOX-JOINTING THE SIDES
STEP 1 Position the clamped together (A)'s against the guide pin, and cut first notch
STEP 2 Place notch over guide pin and cut second notch
Keep same edge against stop when cutting both ends
Stopblock
A
Jig fence
Guide pin
Left edge of boards firmly against guide pin and stop
BOX-JOINTING THE FRONT AND BACK
STEP 1: Cut 1/4 x 17/32" notch in corner
STEP 2: Slide corner of notch firmly against guide pin and stop, and then cut second notch in both boards
Keep same edge against stop when cutting both ends
Stopblock
B
Jig fence
Guide pin
Kerf
Line up left edge of board with left edge of kerf in jig fence



jig. For snug-fitting box joints, the kerfs and the distance between the guide pin and kerf must be exactly ¼". Cut the guide pin to the size stated on the Box-Joint Jig drawing, and glue it into the kerf where shown on the drawing.

6 To box-joint the sides (A) simultaneously, tape the pieces together face-to-face with double-faced tape. Check that the edges and ends are flush. Repeat the taping procedure with the front and back pieces (B).

7 Follow the drawings on the previous page to cut the notches in the side pieces, and then notch the front and back pieces. (To test the setup, we box-jointed scrap ½" stock before cutting the box pieces.) After notching the ends of each piece, separate the pieces, remove the tape, and sand smooth. (We used a thin, wedge-shaped piece of wood to pry apart the taped-together pieces. If necessary, use a splash of lacquer thinner to dissolve the adhesive on the tape.)

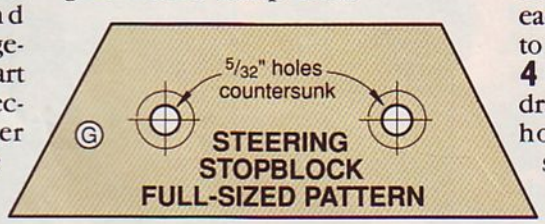
Now, let's add the box bottom and trim pieces

1 Cut a ¼" groove ¼" deep along the inside bottom edge of the box front and back (B) where shown on the Box Assembly drawing and accompanying Groove detail on the previous page.

2 Edge-join ½" stock to form a 10×18" panel for the wagon bottom (C). Later, scrape off the excess glue, trim to size, sand smooth, and rout a ¼" rabbet ¼" deep along the ends (not the edges) of the wagon bottom.

3 Dry-fit the pieces (A, B, C) to check the fit.

4 Cover the mating surfaces of the box-joint fingers of pieces A and B with glue. (To allow the extended open time when applying the glue, we used white woodworker's glue and applied it with a ¼"-wide acid brush.) Glue and clamp the pieces (A, B, C), and check for square. Wipe off excess glue with a damp cloth.



5 Cut two pieces of ⅜" walnut to ⅝" wide by 5' long for trim pieces (D, E). Rout ¼" round-overs along the top edges of each strip. Miter-cut the top and bottom trim pieces (D, E) to length, and glue and clamp them to the box assembly with the inside edges flush where shown on the Box Assembly drawing and accompanying Groove detail.

Next, add the front and rear wheel supports

1 Cut the lazy-Susan spacer (F) to size from ⅜" plywood. Glue and clamp it to the box bottom.

2 Using the Parts View drawing for reference, cut the steering stopblock (G) and axle-support spacer (H) to size. Cut the undercarriage tongue parts (I, J) to the sizes listed in the Bill of Materials.

3 Using the Parts View drawing for reference, mark the taper-cut lines on one edge of parts I and J. Bandsaw along the outside of each marked line, and then sand to the line to shape the pieces.

4 Referring to the Parts View drawing, mark the outlines and hole centerpoints for the axle struts (K, L), and cut them to size. Note that part K is ¼" shorter in length than part L. Next, drill the axle holes where marked.

5 Cut the rear-axle spacer (M) to size. Drill the mounting holes, and

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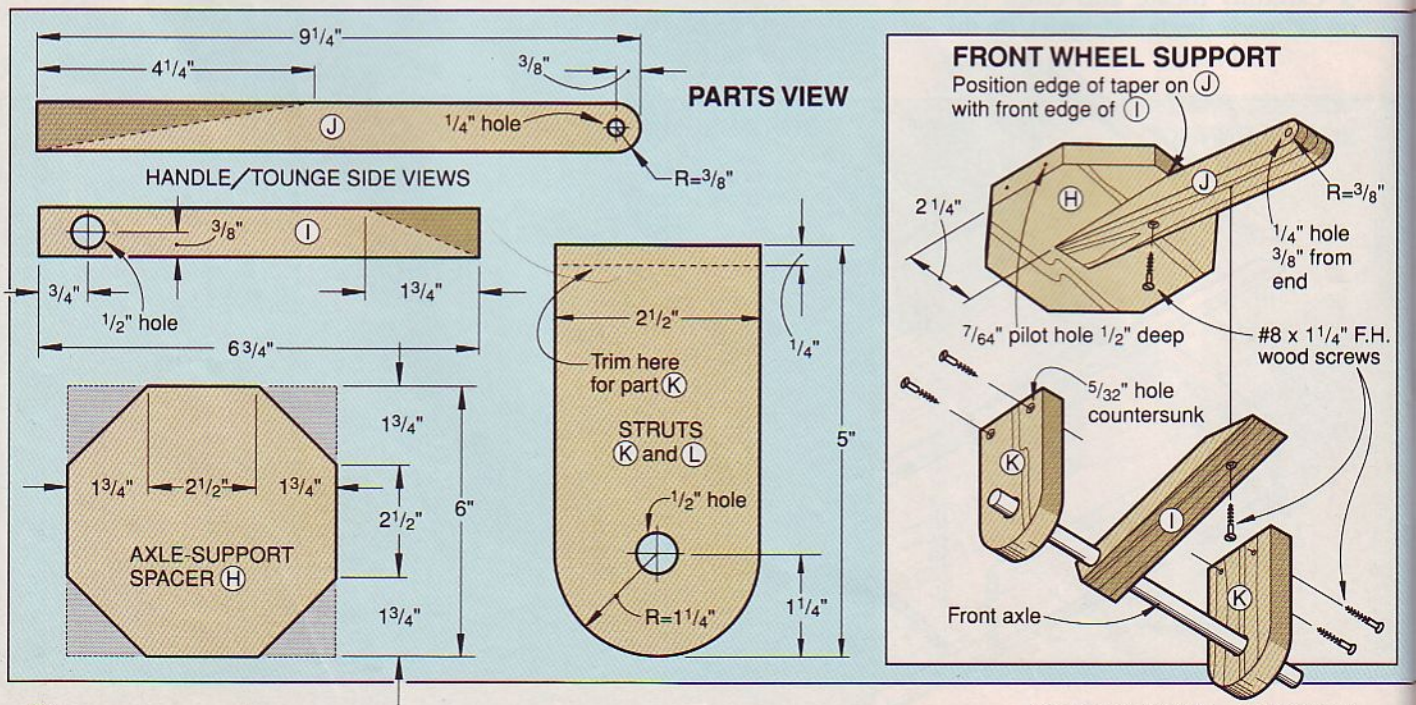
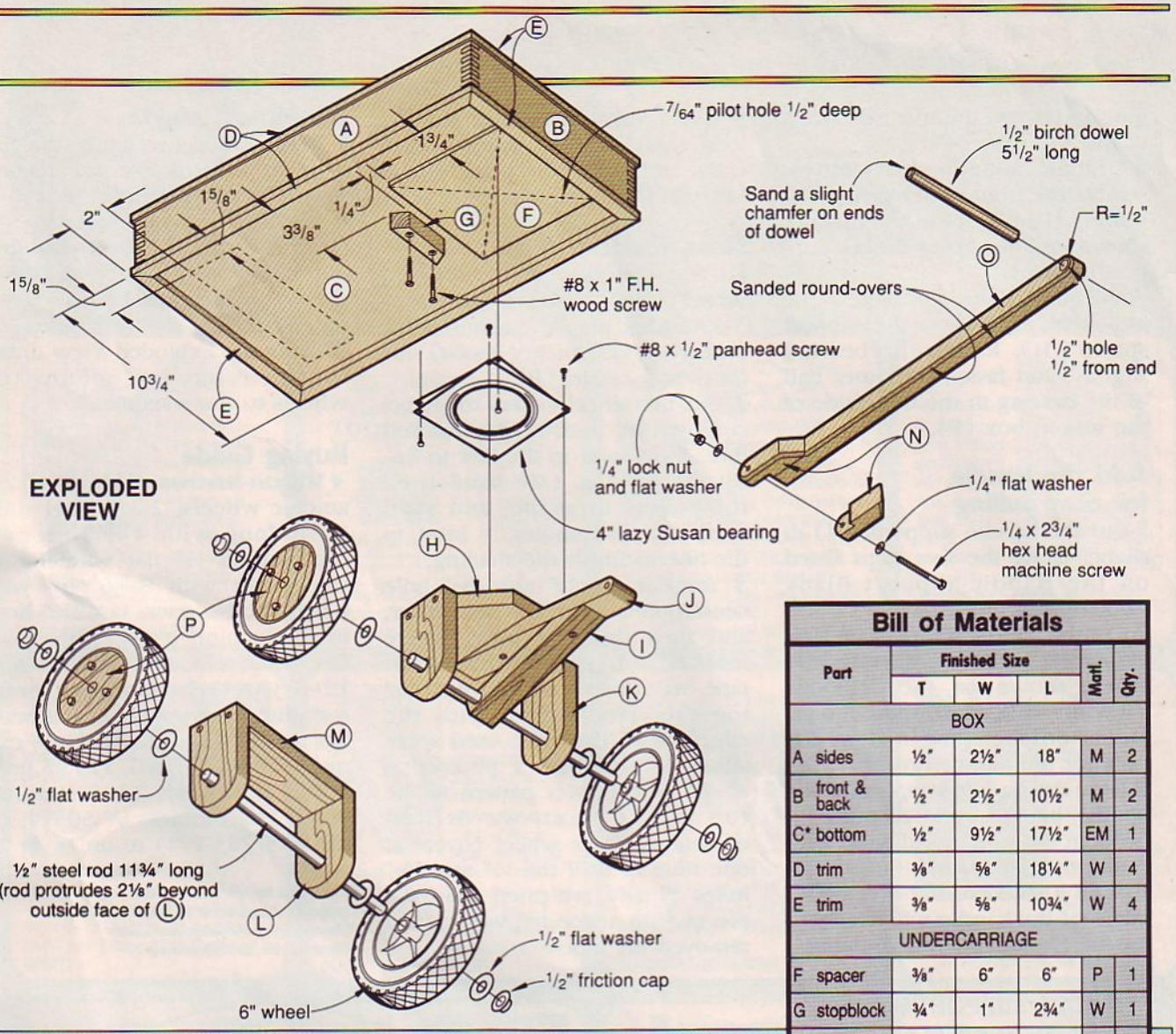




Bill of Materials

Part	Finished Size T	W	L	Matl.	Qty.
BOX					
A sides	½"	2½"	18"	M	2
B front & back	½"	2½"	10½"	M	2
C* bottom	½"	9½"	17½"	EM	1
D trim	⅜"	⅝"	18¼"	W	4
E trim	⅜"	⅝"	10¾"	W	4
UNDERCARRIAGE					
F spacer	⅜"	6"	6"	P	1
G stopblock	¾"	1"	2¾"	W	1
H support spacer	¾"	6"	6"	W	1
I tongue	¾"	1½"	6¾"	W	1
J tongue	¾"	1½"	9¼"	W	1
K front struts	¾"	2½"	4¾"	W	2
L rear struts	¾"	2½"	5"	W	2
M spacer	¾"	2½"	6"	W	1
HANDLE AND WHEEL COVERS					
N* supports	¾"	1"	3"	W	2
O stem	¾"	1"	18"	W	1
P wheel covers	¼"	3½" dia.		W	4

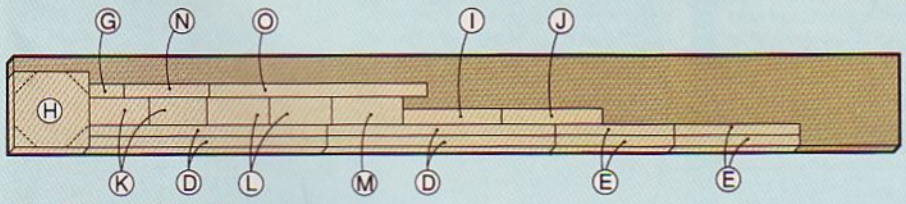
*Initially cut parts marked with an * oversized. Then, trim each to finished size according to the how-to instructions.

Material Key: M—maple, EM—edge-joined maple, W—walnut, P—plywood

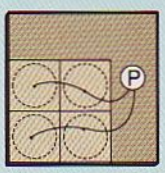
Supplies (other than those listed in the Buying Guide): ½" birch dowel 5½" long, double-faced tape, #8×1" flathead wood screws, #8×1¼" flathead wood screws, clear finish.

CUTTING DIAGRAM

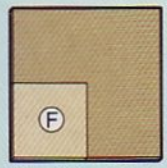
1/2 x 5 1/2 x 72" Maple



3/4 x 7 1/4 x 72" Walnut



1/4 x 12 x 12" Walnut plywood



3/8 x 12 x 12" plywood

glue and screw the rear-axle struts (L) to the spacer (M).

6 Drill the mounting holes and assemble the front undercarriage assembly (H, I, J, K) in the manner shown on the Front-Wheel Support drawing.

7 Drill pilot holes, and screw the lazy-Susan bearing to the support spacer (H). Rotate the bearing slightly, and fasten the other half of the bearing to the underside of the wagon box (F).

Add the handle for easy pulling

1 Cut the handle supports (N) to shape, using the five steps listed on the Handle-Support Blank drawing *below*.

2 Cut the handle stem (O) to size. Drill a ½" hole ½" from one end where shown on the Exploded View drawing. Mark and cut a ½" radius on the same end as the hole for the handle dowel.

3 Glue the handle supports to the handle, being sure to keep the ¼" holes in the supports aligned with each other. Sand smooth.

4 Sand a slight round-over on all edges of the handle where shown on the Exploded View drawing.

5 Cut a ½" birch dowel to 5½" long. Sand a slight chamfer on the ends, and glue it in place in the ½" hole in the handle.

Now, for the wheel covers

1 Use a compass or the full-sized wheel-cover pattern to mark four 3½" circles on ¼" walnut stock (we resawed thicker stock) for the wheel covers (P).

2 Cut the wheel covers to shape, cutting just outside the marked line. Now, sand to the line to finish the shaping. (We bandsawed the covers to shape, and then used our disc sander to sand to the line to finish the shaping.)

3 Transfer the ½" and 5/32" hole centerpoints to each wheel cover, and then drill the holes where marked. (Using double-faced tape, we adhered the wheelcovers together face-to-face with the edges flush. Then, we used spray adhesive to adhere a photocopy of the wheel-cover pattern to the top piece. Next, we drilled through all four wheel covers at one time to drill the ½" and 5/32" holes. Finally, we pried apart the pieces with a wooden wedge, and removed the tape.)

It's almost playtime

1 Finish-sand, and apply the finish. For indoors use, we recommend polyurethane. For use outdoors, apply spar varnish.

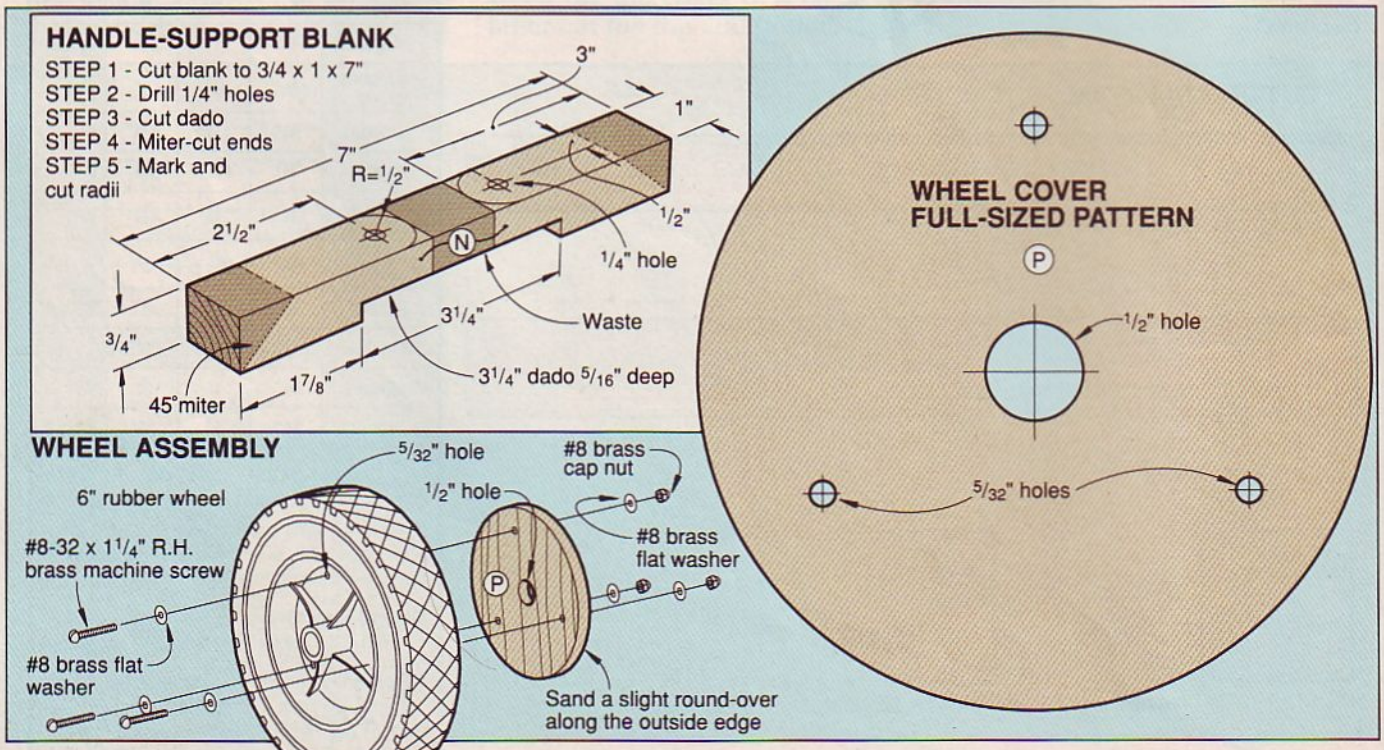
2 Fasten the handle to tongue part (J). Fasten the wheel covers to the wheels where shown on the Wheel Assembly drawing.

3 Using the Exploded View drawing for reference, mount the wheels to the wagon.

Buying Guide

• **Wagon-hardware kit.** 4–6" diameter wheels; 2–½" steel rods 11¾" long with 4–½" friction caps and 8–½" flat washers; 4" lazy Susan with 8–#8×½" panhead wood screws; ¼×2¾" hex-head machine screw with 2–¼" flat washers and a ¼" lock nut; 12–8-32×1¼" roundhead brass machine screws with 24–#8 brass flat washers and 12–#8 brass cap nuts. Kit no. WDWG, $29.95 ppd. Miller Hardware, 1300 Harding Road, Des Moines, IA 50314, or call 515/283-1724 to order.

Produced by Marlen Kemmet
Project Design: Scott B. Darragh
Photographs: Hopkins Associates
Illustrations: Kim Downing



HAND CLAMPS

HOW WOODWORKERS GOT A HOLD ON THEIR WORK

From top: Typical 19th-century wooden handscrew clamp, metal-frame handscrew clamp made by Hargrave, and no. 0 quick-acting clamp manufactured by E.C. Stearns & Co.

Before the 14th and 15th centuries, woodworkers had no dependable glues to hold furniture together. Instead, they relied on other means, including firm mortise-and-tenon joinery, leather lashings, or metal bands.

With strong animal (hide) glue, craftsmen had to develop ways to hold the wood together until the adhesive dried. Yet little is known of this. English historian Joseph Moxon, in his 17th-century book *Mechanick Exercises,* only mentions a "Glew-pot." Illustrations from his day, though, do show workbenches with dog holes in their tops and legs.

Driving an assortment of pegs (dogs) around boards or parts was one way to hold wood. But as tradesmen such as joiners and shipwrights increasingly went from job to job, their need for portable holding devices increased.

Who ever has enough clamps?

By the 18th century, cabinetmakers had a variety of wooden clamps (or cramps, as they're called in England) that they built as needed. There were bar clamps with notched wooden bars, and C-type clamps of traditional and rectangular profiles. But it was the handscrew, shown *above top,* that became the first sophisticated clamping device.

Developed during the late 1700s, the handscrew was shop-built of wood, usually beech, maple, and hickory. To thread the screws, they pushed a dowel into a screw box containing cutting blades. To cut matching jaw threads, they rotated an iron tap in drilled holes. Handscrews varied in jaw length from 4″ to 22″, with openings from 1¼″ to 15½″.

The Stanley Tool Company manufactured all-beech handscrews until 1879, but most manufacturers had replaced wood with metal by the early 19th century, as shown *above center.* The Ohio Tool Company, though, sold all-wood handscrews until 1910.

America's pre-Civil War tool industry boom provided other clamp improvements. Wooden C-type clamps were replaced by ones cast in iron and steel. Hammer's patent G-clamp of 1837 offered instantaneous adjustment in a sliding screw with a winged nut. Even faster was E.C. Stearns & Company's quick-acting clamp, shown *above bottom.* One jaw slid freely along the notched clamp body while the other jaw was a hinged lever that flipped into a locked position.

Even the dependable handscrew experienced a drastic change. The Jorgenson Patent Adjustable Handscrew of 1903 allowed a woodworker to adjust the jaws to any angle, adapting it to more gluing jobs.

Most old clamps have little cash value. But what the heck, if you find ones that still work . . . hey, who ever has enough clamps?

Photograph by Tim Murphy

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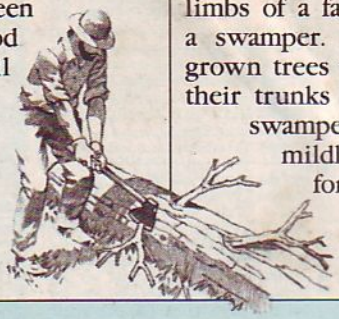
FINISHING TOUCHES

Watch for *WOOD®* magazine's 1992 Build-A-Toy Contest winners in the October issue, and the announcement of the 1993 contest coming soon. There'll be great new prizes!

TALK ABOUT LONG LIFE

It takes 17 trees to produce a ton of paper. But it's been proven that the wood fibers in paper will last through 12 recyclings. So for every ton of paper that's recycled a dozen times, 204 trees are spared.



OH NO! MORE LIMBS!

In turn-of-the-century logging operations around the Great Lakes, the worker that lopped off the limbs of a fallen tree was called a swamper. And because open-grown trees with limbs all along their trunks slowed him up, the swamper developed some mildly derogatory names for them, like grouse ladders, hooters, and squirrel trees.

THE MINWAX CHALLENGE

Do you know a person, group of people, or institution whose woodworking activities improve a community and instill a sense of pride and satisfaction? If so, the Minwax Company wants to hear from you. Your nominee might win an award valued at $10,000.

This year's initial Minwax Community Craftsman Award went to DeLaSalle Education Center of Kansas City. The self-proclaimed last-chance high school has an innovative WoodWorks Program that helps students build self-esteem and grades, as well as terrific woodworking projects. Students sell their work to the public to help offset the program's operating costs.

Nominations for the 1993 award must be received at Minwax by July 31, 1992. Write: *Minwax PR, c/o Gilbert Whitney & Johns, 110 So. Jefferson Rd., Whippany, NJ 07981.*

◀ WoodWorks director Steve Dearing (standing, far right) and students show off a prize project built in Kansas City's DeLaSalle Education Center. The school's woodworking program earned Minwax's first-ever Community Craftsman Award, valued at $10,000.

A WOKABAUT SOMILL? WHAT'S THAT?

According to the International Tropical Timber Organization (ITTO) and the Rainforest Action Network (RAN), less than one percent of all tropical timber operations worldwide are managed for sustainability. But among those, one in Papua New Guinea clearly stands out.

In a letter to U.S. wood importers, Colleen Murphy-Dunning, of RAN, cites the ecologically sensitive timber operations of the country's villagers. Using portable sawmills they call *wokabaut somills,* these loggers do all milling right in the forest. Then, they carry the lumber out, forgoing roads and heavy machinery.

By pinpointing trees of the desired species, these environmentally conscious loggers maintain significant tree cover and protect the soil, water supply, and flora and fauna. They also follow a 25-year cutting rotation of selected trees in tracts of 2-3 acres.

England's Ecological Trading Company currently imports the wokabaut wood, which consists of some attractive—if relatively unknown—species. For instance, there's kwila, a dark brown hardwood with yellow speckles, pencil cedar, and a rosewood look-alike. Highly figured slices of tree crotches and butts are also available for woodturners. For more detailed information, contact: *Max Henderson, Ulatawa Estates Pty. Ltd., P.O. Box 1342, Rabaul, Papua New Guinea.*

Illustrations: Jim Stevenson Photograph: Courtesy of the Minwax Company